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Contributors to Rubber Compounding Progress

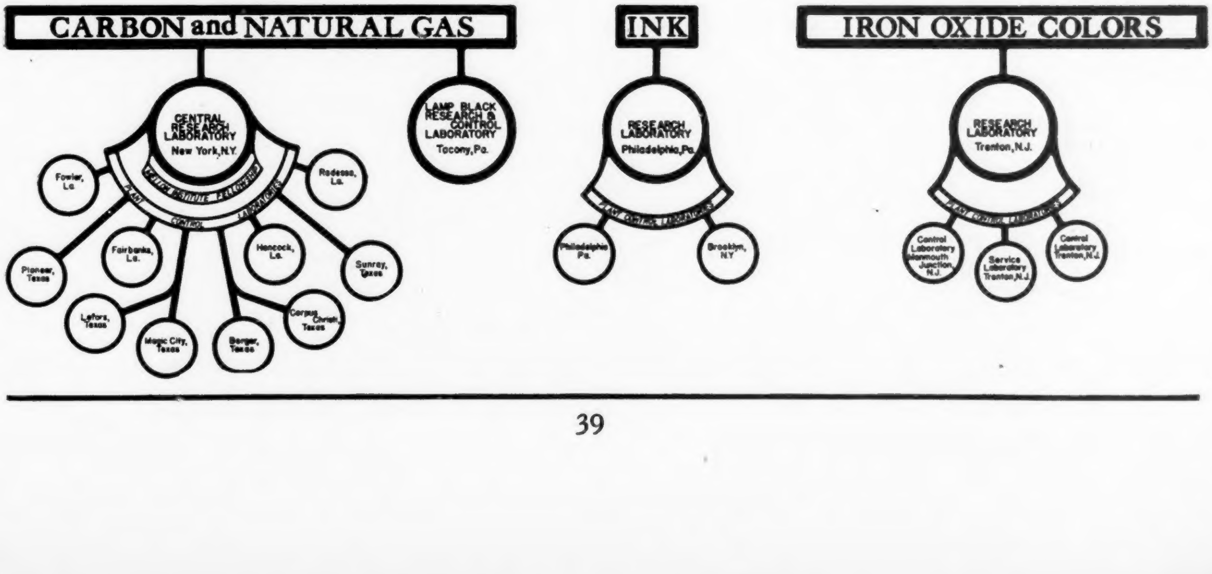
New Research Laboratory of Columbian Carbon Co.

S. C. Stillwagon

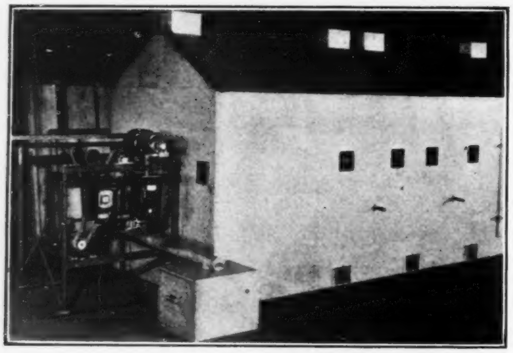
THE carbon black industry stands today as an essential service to the rubber goods manufacturer. The rapid strides made by this industry during the past two and a half decades have contributed substantially to the high quality of our present rubber products. In view of this large measure of advancement in the rubber industry there are some who are prone to assume a position of *status quo,* ready to believe that we have achieved the ultimate. However, there are many companies who, as in the past, are ever expanding their technical resources to include new avenues of rubber research. As long as this zealous attitude persists the rubber industry can be assured of further uninterrupted growth.

Among the leading contributors to the technical development of rubber products, through improved forms of carbon black, Columbian Carbon Co. has been active not only in adapting this natural gas product to compounding practice, but also in promoting the research necessary to

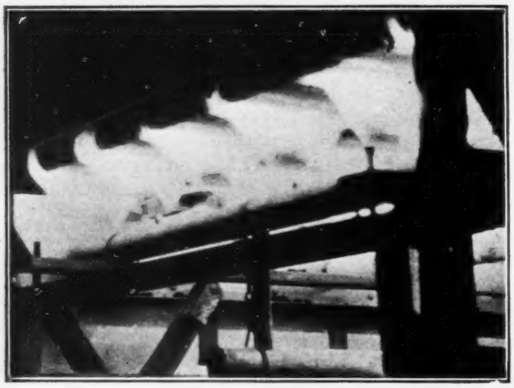
COLUMBIAN CARBON CO.
TECHNICAL ORGANIZATION



Museum and Conference Room



Miniature Plant Producing Colloidal Carbon



Flames Impinging on Channels

the manufacture of more practical and effective materials. This company devotes its major energies to the application and production of carbon black in its many ramifications for use mainly in the ink, paint, plastics, and rubber industries although the outlets are more widely diversified including radio and other resisters, paper, polishes, and even caviar and candy!

Company Organization

The Columbian Carbon Co. was first organized in 1907. The officers of the company, active from the time of its inception, are: F. F. Curtze, president; Reid L. Carr, vice president and secretary; and George L. Bubb, treasurer. Today the company owns and operates 26 factories located in six states. Natural gas wells numbering 688 and concurrently delivering 60 billion cubic feet per year are located on owned or leased properties consisting of 338,000 acres distributed over 12 states. In addition to colloidal carbon the company's products include lamp black, bone black, printers ink and oil, iron oxide pigments, gasoline, and natural gas supplied to Chicago, St. Louis, and other large cities.

From the beginning, the colloidal carbon output of Columbian Carbon Co. has been distributed solely by Binney & Smith Co., 41 E. 42nd St., New York, N. Y.

The Central Research Laboratory and associated technical activities as shown in the organization chart are under the direction of William B. Wiegand assisted by H. A. Braendle.

Objectives and General Facilities

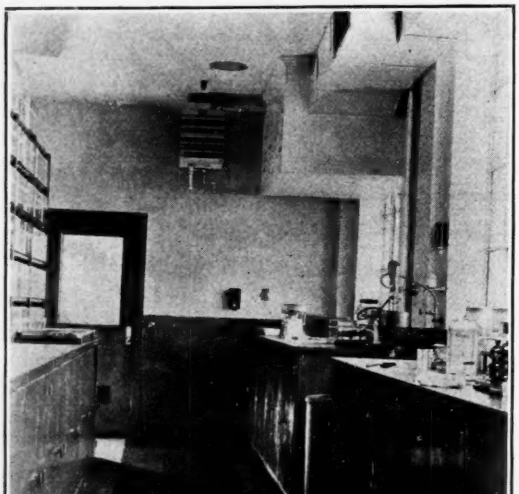
With a view to amplifying and extending its service the Columbian Carbon Co. recently instituted a new research laboratory occupying the four-story and basement building with 11,880 square feet of floor space at 214 44th St., Brooklyn, New York City. Special facilities have been provided for conferences with representatives of carbon consuming industries, and frequent seminar sessions with invited industry groups are planned so as to make possible the correlation of research investigations with the industrial problems of greatest mutual interest.

With complete individual laboratories for the chemical and physical investigation of problems relating to rubber, paint, ink, plastics, and many other consuming products, this segregated unit is uniquely equipped and well manned for all phases of research relating to the manufacture and use of colloidal carbon. Here is dispelled the more or less prevalent idea that the use of carbon black necessarily results in unsightly surroundings. A ventilating installation readily removes dust particles with the air even in the compounding room, thus making it possible for the personnel to wear white coats.

In the library and conference room may be seen an extensive assortment of colloidal carbon samples exemplifying the diversified grades required and also a display of some of the products in which they are used.

Miniature Burning House

Novel in carbon black research is the fact that the laboratory houses a producing plant 13 feet long, 5½ feet wide, and 6½ feet high equipped with four channels 6 inches wide, which exactly duplicates conditions in the larger burning houses in the field. Regularly spaced gas flames impinge in small jets and deposit carbon on the lower flat sides of the iron channels which are drawn back and forward over metal scrapers and hoppers so as to remove and collect the product. Here the effects of different - type flames and of their position with respect to the chan-



Compound Room with Exhaust Ventilation

nels as well as the other variable factors in the process can be studied through mica windows under controlled conditions. The smoke and dust usually present in a producing plant are eliminated in this unit so that inspection of carbon black manufacture can be made without inconvenience.

Rubber Compounding

The weighing of ingredients for batches is done in a separate room with an adequate ventilating system to prevent the settling of dust. Mixing, calendering, and vulcanizing of test samples are accomplished with modern equipment consisting of a mixing mill, an internal mixer, a three-roll calender, and both hand and four-platen hydraulic presses. The latter is equipped with a table adjustable by hydraulic power to the platen level for the removal of molds.

Testing Physical Effect on Rubber

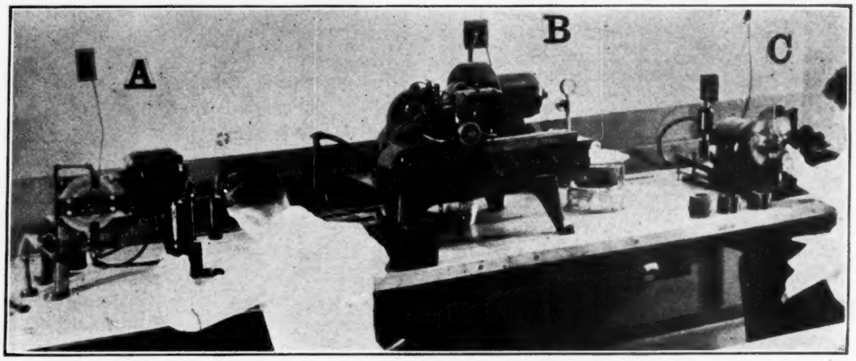
For the purpose of measuring the behavior of various types of colloidal carbon in rubber compounds suitable for a particular purpose, the rubber laboratory is so equipped that the tests will conform in nature to those commonly made in the laboratories of companies producing rubber goods. Here samples are submitted to rigid scrutiny in an air conditioned room to insure uniformity of test conditions. In most instances the standard testing machines have been modified and improved to broaden and refine the scope of the observations.

Tensile and Tear. In addition to measuring the elongation, tensile strength, and modulus, the Scott testing machine is used to determine the tear resistance with kidney-shaped specimens which have been nicked on the inside curvature by means of a special cutting tool.

Rebound. For testing the rebound tendency and the deflection of the sample when struck, a standard Schopper elastometer and a Healey-Goodyear pendulum type of instrument are used.

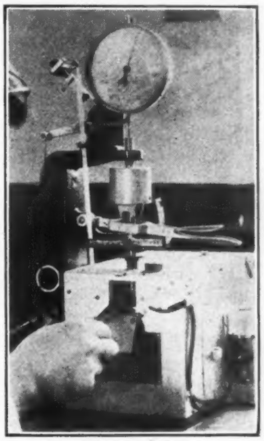
For extremely accurate rebound measurement the latter machine has been modified so as to produce an audible signal in a loudspeaker through an electrical contact made by a metallic pointer, attached to the pendulum, as it passes an extended mercury column in a vertical open-end capsule. This capsule holder permits adjusting the height of the drop of mercury at the top of the column, and the attachment can be readily moved along the scale until finally positioned at the crest of the rebound swing when a single click will be heard in the loudspeaker. If the setting is too high on the scale, no signal will be heard, and if too low, two clicks, as the pointer will contact the mercury for each directional swing. Repeated impacts enable the proper setting at the highest point in the rebound stroke. All pawl friction is thus eliminated.

For measuring deflection of the sample under impact this machine is also equipped with a separate set of electrical contact points with micrometer adjustment of the fixed point to a position of greatest opening at which the signal will be registered through the loudspeaker when the impact is made.

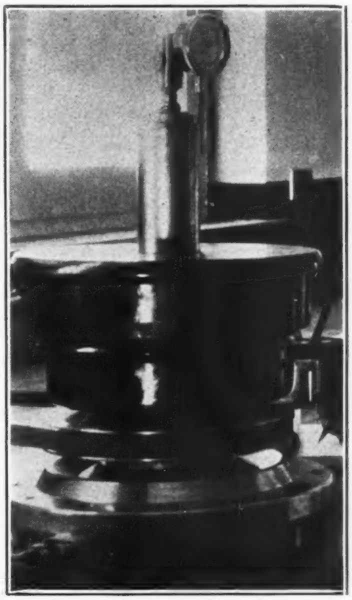


Abrasion Machines—A, du Pont (Grasselli); B, U. S. Rubber; C, Goodyear Angle

Plasticity. A Goodrich plastometer measures the deformation of cylindrical samples of precise dimensions subjected to a predetermined weight for a definite time at a controlled temperature. The specimens rest for 30 minutes in the warming chamber before being moved on a turntable into position for the test. This apparatus is also used for a scorching test.


Goodrich Plastometer

State of Cure. The loss of elasticity at low temperatures indicating the amount of combined sulphur which in turn represents the degree of vulcanization obtained in cured rubber samples is measured on special equipment by the T-50 test which was developed by the general laboratories of the U. S. Rubber Co. When small strips of rubber stretched to between one half and two-thirds of the breaking elongation have been frozen at minus 50° to 70° C. in acetone circulated over dry ice, the tension is released, and as the temperature is slowly raised, the specimens contract. When the test piece has retracted to 50% of its initial elongation, the temperature of the acetone bath is recorded as the T-50 of that particular stock.


Schopper Detrition Machine

Testing Resistance to Service

To exemplify for comparative purposes some of the conditions which rubber products must withstand in actual usage this air-conditioned laboratory is equipped with a number of standard and special machines, the results from which present an informative perspective as to the relative endurance

qualifications of compounded mixes.

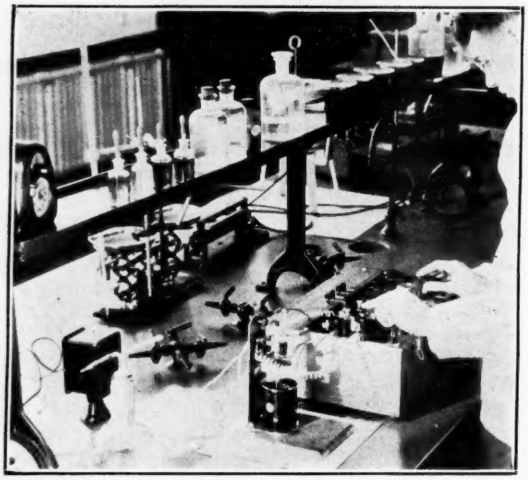
Flexure. The De Mattia flexing machine is so encased that tests may be conducted in an atmosphere of humidified air or any desired gas at a controlled temperature.

Abrasion. Three machines—U. S. Rubber, du Pont (Grasselli), and the Goodyear angle abrader—are used to make tests of differing natures and to check results on this important property.

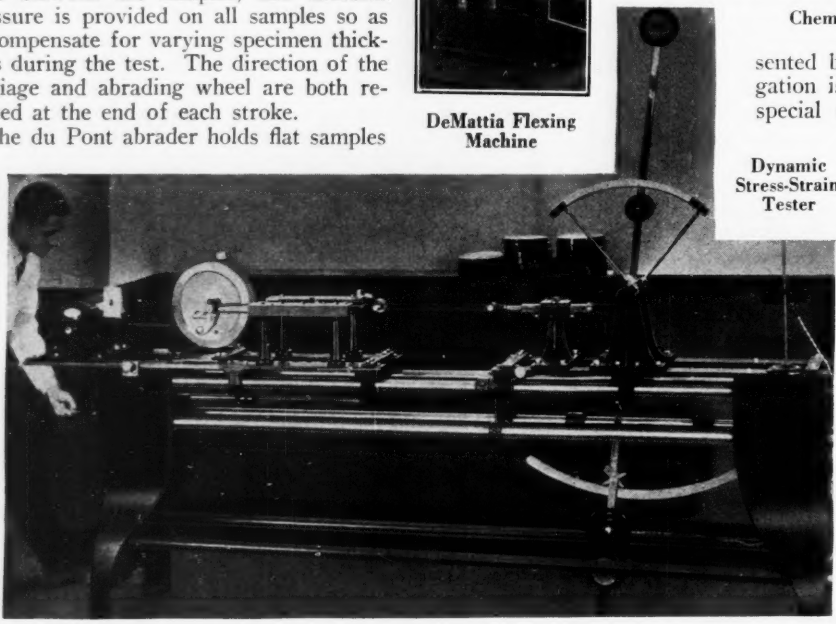
The U. S. Rubber machine operates on a principle similar to that of a planer, and the carriage supports a unit of five flat rubber samples in tandem against which a small wheel covered with abrasive cloth revolves in a direction opposite to the motion of the samples. A cam arrangement raises the abrasion wheel at the dividing lines between the samples, and uniform pressure is provided on all samples so as to compensate for varying specimen thickness during the test. The direction of the carriage and abrading wheel are both reversed at the end of each stroke.

The du Pont abrader holds flat samples under constant pressure against the lateral surface and near the periphery of a revolving abrasive stone. Through the braking action, variations in the power consumption can be continuously read from a spring balance holding the arm to which the samples are attached.

DeMattia Flexing Machine



Chemical Laboratory with pH Meter



Dynamic Stress-Strain Tester

The Goodyear angle abrader utilizes an annular ring as a sample mounted on a wheel which is tangent to and driven by friction against the lateral side of the abrasive wheel. By rotating the axis of the sample in relation to the radius of the power driven wheel, varying degrees of abrasion can be obtained.

Detrition. Tests in the Schopper detrition machine demonstrate the effect of internal heat generated within solid rubber ball samples when rotated under pressure. After the balls have been run to failure or for a definite time, they are cut into halves, and the area of failure is compared in appearance with a set of empirical standards. The rubber balls are run in a groove between two heated plates, the lower stationary and the upper revolving under pressure as desired.

Dynamic Stress-Strain. When the elongation of rubber is frequently changed through pulsating tension, internal heat is generated, and fatigue occurs more rapidly than when the stretch is constant. This fatigue represented by the resulting increased elongation is produced and measured on a special machine designed by the Columbian Laboratory staff.

Test samples in the form of annular bands are stretched over two flat pulleys with parallel axes. One pulley is connected eccentrically by a connecting rod to a power driven flywheel so as to produce oscillating pulls of predetermined length and frequency, thus resulting in a varying strain on the sample. This pulley, the flywheel, and the motor are jointly located on a carriage which can be readily moved longitudinally on the base of the machine so as to affect the tension on the sample. Through a rack and ratchet the power driven pulley is turned slightly at each stroke of the connecting rod so as continually to bring new portions of the band in direct contact with the pulleys. The other pulley is attached to a balanced pendulum which through the initial strain on the sample is set in a deflected position at zero on a curved scale before the test is started. The frequency of the flywheel is out of phase with the pendulum so that the latter registers average stress and does not respond to the separate impulses which are absorbed by the sample. As the stress in the test specimen, represented by elongation, increases, the pendulum approaches a vertical position, and its motion from the zero position, as the test proceeds, indicates the stress and fatigue caused in the rubber.

Included in the apparatus in the completely equipped chemical laboratory are three pH meters of the Coleman, Leeds & Northrup, and Beckman types for the determination of hydrogen ion concentration in colloidal carbon. As diverging grades of black assume dissimilar shades of color, two special lamps have been installed in a dark room so as to permit careful examination uninfluenced by the variation between artificial and sun light.

This extensive preparation for organized research is

(*Continued on page* 52)

Statistical Background of Early American Rubber Industry—I

E. G. Holt

THE dearth of published information on rubber during the period of early development of the American rubber manufacturing industry presents a difficulty experienced by every person interested in tracing its history. The excellent bibliography published in the American edition of Memmler's book has as complete a list of references as any; up to 1850 this lists but eight references on rubber and only one in the English language; up to 1880, 52 references on rubber and gutta percha, of which 10 were for gutta percha specifically, and only 14 of the remaining 42 were in the English language. Until INDIA RUBBER WORLD began publication in 1889 there was no United States periodical devoted to the industry. It is particularly difficult to secure facts bearing on the economics of the young industry.

During all the early period, however, the United States Government published an annual report of trade through the Treasury Department, and information obtainable from that source contributes much to clear understanding of the developments. We know from Goodyear's "Gum Elastic" that unvulcanized rubber shoes were imported regularly and in growing quantities from Brazil after 1825, that the founding of the first rubber factory in this country in 1832 led to a miniature boom in domestic rubber manufacture, that Goodyear discovered the acid process of curing thin rubber articles with nitric acid in 1836, that he discovered vulcanization in 1839, and secured patent on it in 1844, after which development of the industry was more rapid. The trade in imported rubber shoes was of great importance in these early days, a Boston newspaper in the early thirties carrying advertisements of several trading firms, sometimes offering as many as 10,000 pairs for sale; in all probability more rubber was imported in the form of shoes than in the form of crude rubber.

This article traces the development of American rubber imports from 1826 to 1855, on the basis of official foreign trade statistics reporting values, estimates the annual tonnage of imports, and shows the sources of imports, with supporting principal statistics of Brazilian exports of rubber and rubber shoes to the United States from 1837 to 1854.

ALTHOUGH it is known that unvulcanized rubber articles, principally rubber shoes, and some crude rubber were imported to the United States during the pre-vulcanization period, the first official U. S. statistics were reported on rubber shoes of the unvulcanized type for the years 1848 and 1854 and on unmanufactured rubber for the year ending June 30, 1855. As the result of painstaking research and the correlation of indicative data, the author has been able to trace the development of American rubber imports through the years from 1826 to 1855. While it has been necessary to make some reasonable estimates and compute the end-figures, fairly accurate conclusions have produced a basis for observing the early trends in the importation of unvulcanized manufactured articles and their subsequent replacement by crude rubber for fabrication in this country.

Tariff Schedules the Key to Early Rubber Imports

Unmanufactured rubber was first separately reported in the United States import statistics for the year ended June 30, 1855, and by value only, at $1,660,141. Rubber shoes of the unvulcanized type, imported from Brazil, were a separate item in the statistics from 1848 to 1854 and are identifiable (pairs and value) for part of 1847 and for 1855, after which imports ceased entirely or were included under "unmanufactured rubber" imports.

It has been thought that rubber imports prior to 1855 were unidentifiable in the reported statistics, as they were not definitely enumerated. Careful research makes possible the compilation of statistics covering the value of imports from Brazil, New Grenada (modern Colombia), Dutch East Indies, and British East Indies, which were the chief sources of 1855 imports, for years back to 1847, prior to which the value of imports from Brazil can be quite accurately ascertained back to 1842, and a reasonably sound calculation of the value trend of imports from Brazil can be made back to 1826; it is hoped the writer will be pardoned for making value and tonnage estimates with such freedom as is necessary to interpret available data in definite terms, since only by such interpretation can they be helpful.

The tariff schedules furnish the key to the value of rubber imports from leading sources prior to 1855; "unenumerated" dutiable imports were reported according to the rate of duty assessed, by countries, and "unenumerated" free imports were also reported by countries; hence by ascertaining the rate of duty on rubber and studying the data reported on imports from the chief rubber sources, a fairly close approach can be had to the value of "rubber" imports.

Rubber found mention in the United States tariff schedule for the first time in the act effective July 13, 1832, under which "india rubber, unmanufactured or in bottles or sheets" was free of duty; prior to 1832 the imports of rubber and rubber shoes appear to have been subject to 15% duty, with other unmanufactured articles. This appears to be the first instance in which the United States

Government became officially interested in the commodity, except in the matter of patent records. Crude rubber imports continued duty-free until December 1, 1846, when they were subjected to an ad valorem rate of 10% which continued in effect until 1857. "Manufactures wholly or in part of india rubber" were first scheduled in the tariff effective August 30, 1842, being dutiable at 30% ad valorem until 1857. "Gum elastic articles" were also mentioned separately in that tariff, being dutiable at 20% until December 1, 1846, when the rate was increased to 30%, to correspond with other rubber manufactures; use of the term "gum-elastic" indicates that Charles Goodyear was probably influential in securing this clause in the tariff; while the Roxbury India Rubber Co. was probably a moving factor in the 1832 clause.

Imports from Brazil—1826-1842

In this period imports consisted mostly of unvulcanized rubber footwear until 1832, when rubber manufacture was begun. The manufacturing enterprises were not successful, and the rubber "boom" soon ended, but trade in imported rubber shoes continued. Moreover the manufacture of Goodyear "patent" shoes and other articles by the acid gas process assumed some importance by 1838, and the trade in imported shoes declined for a time, but was again gaining and threatening to oust the "patent" shoes from the market until Goodyear's discovery of vulcanization paved the way for real success in the domestic manufacturing industry. The total value of "unenumerated" imports from Brazil averaged $57,672 from 1821 to 1825 and included very little rubber or rubber shoes; the value of non-rubber imports from Brazil in 1855 was only $118,686; it appears therefore that on the average, non-rubber imports may have increased $2,000 annually during this period. The remainder of the total value of unenumerated imports from Brazil up to 1843, when more definite information became available, must have been chiefly rubber or rubber articles. Statistics shown are for years ended September 30. To estimate tonnages in the table an average price of 20¢ a pound was used; certain statements in Goodyear's "Gum-Elastic" lend some support to that figure; the estimated tonnage, however, undoubtedly represents "rubber shoes" more than "rubber."

PROBABLE UNITED STATES "RUBBER SHOE" AND "RUBBER" IMPORTS—1826-1842

Years	Rate of Duty	Total Unenumerated	Non-Rubber Estimated	Rubber Value	Rubber Tons
1826........	15%	$62,458	$59,000	$3,458	8
1827........	15%	71,289	61,000	10,289	23
1828........	15%	85,489	63,000	22,489	50
1829........	15%	123,436	65,000	58,436	130
1830........	15%	139,075	67,000	72,075	161
1831........	15%	147,324	69,000	78,324	175
1832........	15%	287,169	71,000	216,169	483
1833........	Free	277,407	73,000	204,407	456
1834........	Free	317,715	75,000	242,715	541
1835........	Free	248,355	77,000	171,355	382
1836........	Free	212,545	79,000	133,545	298
1837........	Free	289,509	81,000	208,509	465
1838........	Free	154,770	83,000	71,770	160
1839........	Free	153,825	85,000	68,825	153
1840........	Free	204,396	87,000	117,396	262
1841........	Free	242,877	89,000	153,877	344
1842........	Free	262,898	91,000	171,898	382

During this 17-year period, prior to the application of Goodyear's vulcanization patent beyond the experimental stage, rubber imports from Brazil may be roughly calculated at 4,500 tons, with a value of $2,000,000, lending important support to the rubber producing industry in Brazil in its commercial infancy. Doubtless small amounts of rubber from other tropical American countries were also imported, but neither Asiatic nor African varieties were yet being marketed.

Imports from Brazil—1843-1855

Imports of unmanufactured rubber from Brazil were duty-free from 1843 to 1846, after which the ad valorem rate of 10% was applied. Rubber articles imported from Brazil all appear to have been subjected to the 30% ad valorem rate, as very little was entered at the 20% rate. After 1846, imports of rubber shoes were definitely reported in pairs and dollars, all coming from Brazil, and other articles dutiable at 30%, presumably rubber, were also reported by value. The following table summarizes these imports, the final value column representing quite closely, it may fairly be concluded, the value of rubber and unvulcanized rubber articles imported; while the tonnage column is estimated on the basis of 25¢ a pound except for the last two years, when a 30¢ basis was used in the belief that increasing demand must have caused a rise in price. Data for 1843 are for nine months, the fiscal year changing at this time to end June 30.

PROBABLE RUBBER IMPORTS FROM BRAZIL—1843-1855

Years Ended June 30	Rubber Articles: Rubber Shoes Pairs	Rubber Shoes Value	Other Articles Value	Crude Rubber Value	Total Value	Estimated Long Tons
1843........	......	......	$53,528	$25,537	$79,065	141
1844........	......	......	91,453	24,968	116,421	208
1845........	......	......	118,674	106,082	224,756	401
1846........	......	......	95,869	142,856	238,725	426
1847........	......	......	72,544	170,416	242,960	435
1848........	348,634	$68,620	5,968	350,401	424,989	759
1849........	345,020	52,335	14,460	233,777	390,572	536
1850........	295,622	49,495	5,335	260,016	314,846	562
1851........	123,027	22,644	11,743	599,581	633,968	1,131
1852........	16,429	3,766	6,919	389,143	399,828	715
1853........	36,259	9,589	27,073	788,088	824,750	1,472
1854........	4,825	1,319	31.658	1,688,642	1,721,619	2,560
1855........	114	24	......	1,155,871	1,155,895	1,720

It may be noted that the shoe imports were entered at an average value of only 17.7¢ a pair during 1848-1855, and the rather heavy Brazilian shoes could hardly have averaged much less than a pound per pair so that the estimated tonnage of rubber probably is on the low side. The shoe imports declined from the time when they began to be reported in the annual trade returns, having apparently passed their peak in 1845, in which year imports of crude rubber assumed much more importance than previously.

As the American demand lessened for shoes made by Brazilian Indians, there ensued a far greater demand for rubber in other forms, and the Indians were soon making sheets and slabs instead of the shoes and bottles of former times. Up to this time the rubber articles imported from Brazil had been uniformly dry and fairly clean; from this time forward there was an increasingly large factor of waste from moisture and dirt in crude rubber from Brazil as well as from other sources, and the manufacturers had already been forced to undertake cleaning, washing, and drying operations preliminary to making use of the raw material.

Brazilian Export Statistics

Corroborative statistics bearing on this trade in early days, when Salem, Mass., was for a time leading port of entry for rubber imported as shoes and in other forms, are to be gleaned from Brazilian sources. The imports of rubber shoes are definitely shown as declining when they were first separately enumerated in United States official import statistics. The exports of such shoes from Brazil, according to statistics published in the "Personal Narrative" of Thomas Hancock, were officially reported from 1837 onward as follows, in pairs, showing that this trade was at its peak in the early forties. The exports of rubber in other forms from Brazil to the United States, in pounds, as reported by Hancock, are shown in the second table. Until 1846-47 total shoe exports, in *pairs,* far exceeded other rubber exports, in *pounds,* to the United States. After 1843 the exports of rubber other than shoes to the United States increased very rapidly. As American de-

mand for imported shoes declined, the Brazilian exporters sought to develop a larger market in Europe, but without much success.

Brazilian Exports of Rubber Shoes, in Pairs, to All Countries

Years	Salem (United States)	Boston (United States)	New York (United States)	Europe	Total
1837	69,822	7,654	35,561	17,942	130,979
1838	97,486	23,813	52,335	38,829	212,463
1839	77,982	17,694	.....	32,509	128,185
1840	96,127	80,026	27,403	30,927	234,483
1841	141,341	70,198	96,878	8,870	317,287
1842	239,115	100,035	123,080	16,230	478,460
1843	119,339	99,997	80,141	87,345	386,822
1844	99,871	78,042	108,223	117,929	403,065
1845	189,982	57,185	129,403	40,768	415,338
1846	127,008	3,386	168,111	107,573	416,078
1847	107,128	31,654	207,219	84,888	430,889
1848	108,421	.....	110,964	17,994	237,379
1849	115,898	.....	190,535	7,192	313,625
1850	80,496	6,217	165,254	62,912	314,879
1851	47,557	.....	16,550	74,767	138,874
1852	19,283	.....	.....	67,496	86,779
1853	39,455	.....	6,875	33,553	79,883
1854	15,787	.....	.....	22	15,809

Brazilian Exports of Other Rubber, in Pounds, to United States

Years	Salem	Boston	New York	New Haven	Total U.S.
1837	27,808	5,165	12,387	.....	45,360
1838	20,753	7,003	3,756	.....	31,512
1839	8,946	2,176	.....	.....	11,122
1840	18,048	19,401	2,568	.....	40,017
1841	49,698	7,111	50,656	.....	107,465
1842	19,114	11,401	37,965	.....	68,480
1843	15,466	13,156	13,156	.....	41,778
1844	46,400	37,501	39,488	.....	123,389
1845	129,408	41,920	140,176	.....	311,504
1846	186,238	21,168	222,208	.....	429,614
1847	237,152	8,992	406,112	.....	652,256
1848	216,416	.....	445,408	.....	661,824
1849	176,640	.....	733,152	.....	909,792
1850	530,816	50,912	656,480	.....	1,238,208
1851	745,184	.....	749,183	.....	1,494,367
1852	405,963	.....	914,409	145,760	1,466,132
1853	686,558	.....	1,309,200	160,064	2,155,822
1854	750,288	136,190	2,275,064	207,405	3,368,947
1855	584,778	420,592	1,983,937	283,836	3,273,143
1856	519,154	234,225	1,462,967	115,001	2,331,347

It is possible to draw a rough comparison between these statistics and the United States data on imports from Brazil, indicating some agreement in trend between the two sets of figures, but with considerable annual variations. Considerable depends, of course, on the average weight per pair of shoes, which no doubt varied over this period; also it is not certain that the Brazilian statistics were complete and accurate at the time. Note particularly the downward trend of the rubber exports from Brazil to America after 1854, as shown above.

Other Rubber Imports—1847-1854

A subsequent table shows that in 1855 the total imports of crude rubber into the United States were valued at $1,660,141—much greater than the imports from Brazil alone. The other important sources of imports in 1855 were New Grenada (including modern Colombia and Panama), England, the Dutch East Indies, the British East Indies, and Holland. By methods similar to those followed in estimating rubber imports from Brazil, the value of arrivals from the other primary markets can also be ascertained with reasonable accuracy, for years ended June 30, from 1847 through 1854, as follows:

Years	Brazil	New Grenada	Dutch Indies	British Indies	Total	Estimated Tons
1847	$242,960	$470	$2,542	$1,085	$247,057	441
1848	424,989	179	5,174	2,607	432,949	773
1849	300,572	1,166	12,011	5,010	318,759	570
1850	314,846	1,646	8,520	18,306	343,316	613
1851	633,968	6,998	9,883	33,915	684,764	1,221
1852	399,828	48,136	36,542	118,566	603,072	1,078
1853	824,750	30,388	7,714	59,750	922,602	1,648
1854	1,721,619	60,672	50,471	112,237	1,944,999	2,895

Exports from England to the United States in this period, according to Hancock's "India Rubber Manufacture," amounted to eight tons in 1847, 75 tons in 1851, 85 tons in 1852, 94 tons in 1853, and 284 tons in 1854. During the 13 years, 1842 to 1854 inclusive, however, England imported from the United States 298 tons of rubber, and possibly there were other reexports from the United States to the Continent of Europe; so the above table represents approximate American net imports.

Summary of Industry Trend—1826-1855

The following summary table therefore portrays, as accurately as is possible from rubrics, the trend of United States estimated imports of rubber during the first 30 years of the trade. A period of 25 years passed before annual consumption reached 1,000 tons, but from 1850 to 1855 the imports quadrupled, an extremely rapid growth. During most of this period Brazil was almost the sole source of the imports; imports from other sources were of importance only during the last decade covered. Total imports as estimated amounted to 17,350 tons valued at $9,822,163; over half of these imports entered in the last five years of the period.

Estimated United States Imports of Rubber—1826-1855

Years*	Long Tons	Value	Years	Long Tons	Value
1826	8	$3,458	1841	344	$153,877
1827	23	10,289	1842	382	171,898
1828	50	22,489	1843†	141	79,065
1829	130	58,436	1844	208	116,421
1830	161	72,075	1845	401	224,756
1831	175	78,324	1846	426	238,725
1832	483	216,169	1847	441	247,057
1833	456	204,407	1848	773	432,949
1834	541	242,715	1849	570	318,759
1835	382	171,355	1850	613	343,316
1836	298	133,545	1851	1,221	684,764
1837	465	208,509	1852	1,078	603,072
1838	160	71,770	1853	1,648	922,602
1839	153	68,825	1854	2,895	1,944,999
1840	262	117,396	1855	2,464	1,660,141

*Years ended September 30, through 1842; years ended June 30 thereafter.
†Nine months ended June 30, 1843.

First Rubber Industry Census for 1849

The 1850 industry census was the first to provide any information regarding the American rubber manufacturing industry. In that census, covering the year 1849, statistics were reported for the "india rubber goods" industry, but it is probable that the report was incomplete. In the tabulation shown below certain other industries separately reported are included in the belief that rubber was an important material in those industries at the time, and because it is probable that corresponding data were in most cases included in the statistics for the "india rubber and elastic goods" industry in subsequent census reports. On the other hand statistics for the "riveted hose" and "fire hose" industries reported for 1849 were excluded from the table, as the material then used for such hoses was leather. Of the 34 establishments making "india rubber goods" in 1849 nine were in New York, eight in Connecticut, six in New Jersey, five in Massachusetts, two each in Rhode Island and Maryland, and one each in New Hampshire and Pennsylvania.

1849 Census Data on United States Rubber Industries

Industry	Companies	Capital	Employes	Wages	Materials	Products
India rubber goods	34	$1,455,700	2,568	$537,828	$1,608,728	$3,024,335
Suspenders	5	20,800	362	33,756	75,300	171,000
Webbing	2	8,000	34	6,408	11,024	15,400
Total	41	$1,484,500	2,964	$577,992	$1,695,052	$3,210,735

Analysis of the "india rubber goods" statistics shows that 53.1% of the value of products went for materials and 17.9% for labor, leaving 29% to cover overhead and profits on the capital investment of a little under a million and a half. Five years later the industry was four times as large in terms of rubber consumption.

Note that the average wage per employe for the year was only $209. The "average" company had a capital of $42,820, employed 75 hands, and produced goods to the value of $89,000, a capital turnover of 2.1.

The Kaysam Process Opens New Fields to Latex Application[1]

D. C. McRoberts[2]

BECAUSE of the very direct relation existing between the Kaysam process and latex, any general discussion of the former and its practical application possibilities virtually necessitates some discussion, if not actually some predictions regarding the latter.

Kaysam is definitely a *process*—not a raw material, as it is apparently so oftentimes misunderstood to be. Nor is it the name of a finished product or a class of products, except perhaps in the sense that certain finished products are frequently distinguished from other similarly appearing ones by a nomenclature that involves the use of the name of the process by which they are made; such for instance as: Gum-dipped Tires, Cut Thread, Dipped Gloves, Wrapped Hose, Blown Dolls, etc.

The Kaysam *process* is a method of manufacturing rubber products by casting or molding them directly from compounded latex. Herein practice necessitates pouring the liquid latex compound directly into the mold cavity, as many persons always have and still erroneously believe to be the case in the crude rubber art.

Like latex, to which it applies, the Kaysam process involves many underlying, only partially revealed physical and chemical principles. On the other hand, as is true now also with latex, numerous other underlying scientific principles of the Kaysam process are thoroughly enough known to permit of that desirable range of flexibility of manipulation and application and that positive control of processing procedure and product quality which together constitute the important qualifying requisites for industrial acceptance today.

The purpose of this paper resides entirely in the intention to treat the Kaysam process in its practical application phases so as to permit a broad comprehension of its potentialities, along with those of latex, that may forecast importance to the future progress of the rubber industry.

The first contact of civilized man with rubber, so far as we know, occurred late in the fifteenth century and related to balls crudely fashioned by natives, undoubtedly from latex. The native applied his limited mental resources to the natural method of fashioning balls, footwear, and bottles directly from this unique liquid material. He was not prevented from so doing, or did he probably ever suspect the likelihood of any lurking difficulties, owing to the fact that his raw material was available when and where it suited his desire to manufacture.

Growth of the Crude Rubber Industry

Such was not the case with civilized man. The source of latex was in the New World, and his base of operations was far away in both time and distance in the Old World. Attempted transportation of the liquid resulted in the automatic separation of the solids and the serum, thus rendering the original material disappointing and useless.

Both materials, the original latex and the accidentally resulting coagulum, attracted much scientific and commercial interest during all the intervening years from then to now. The latex evaded the mastering attempts of all early scientists. The coagulum, however, proved somewhat more yielding. Certain practical and novel uses were found for it. Its use grew, and an industry developed which for many years to come was destined to evade reconsideration of the direct method of latex application. The extent of its growth and importance since is too well known to warrant comment here.

In any event it is a colossal industry of indispensable importance to the general welfare of all civilization and has been built about the use of crude rubber as a raw material in spite of the inherent economic wastes, which now are being increasingly realized, as they relate both to fabricating practices and to the preservation of the resulting product quality characteristics.

Growth of the Latex Industry

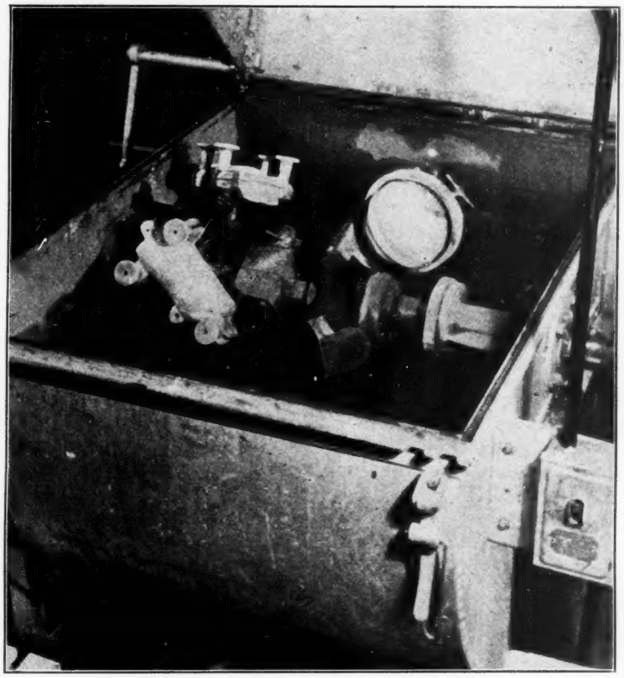
Latex is a colloidal substance and, as such, tenaciously adheres to the peculiar physical principles of colloidal systems. The existence of this class of materials has been known as "colloids" since approximately 1850, but comparatively little, indeed, has been known of their habits until since the beginning of this century. Constantly increasing volumes of literature have been produced to impart the rapidly accumulating present store of information regarding colloidal phenomenon. The door to a new and more thorough understanding of matter now is just open.

To numerous competent rubber scientists is due credit for a vast new understanding of these principles as applied to rubber, and more importantly to latex. The past 20 years have brought so much enlightenment regarding the manner of latex stabilization under a wide variety of conditions that the status of its compounding technique can be likened to that of crude rubber compounding as it existed but a few years ago, at a time approaching a century after the true inception of the crude rubber industry. That numerous leading compounding ingredient manufacturers and suppliers are now maintaining latex laboratories to render technical assistance to the practical latex compounder is a matter of greatest sig-

[1] Presented Oct. 15, 1937, before the New York Group, Rubber Division, American Chemical Society.
[2] Assistant to the President, Kaysam Corp. of America, 41 E. 57th St., New York, N. Y.

nificance regarding the rapidly growing trend of latex use in the rubber industry.

If it is true that the tempo of literature inevitably foretells the direction of major movements, we have but to reflect upon the constantly increasing ratio of latex-to-rubber activities during the past several years to be fully appreciative of the fact that as an industry the latex era is not just coming; it is here. Consider, for instance, the latex contributions of the Rubber Division, A. C. S.; those of the text pages of the press of the rubber industry both in this country and abroad; and those also by competent authors in the form of books that deal entirely or in substantial part with the scientific, practical, and patent phases of this important movement.



Mechanism for Rotating Hollow-Article Molds on Two Axes; Right—Both Axes, Continuous; Left—Lateral Axis, Intermittent

Increase in Latex Imports

At a certain stage in the accumulation of knowledge of latex principles the direct use of latex as such began in industrial applications. Such information as is available indicates that total exports of latex (expressed in solids content) from the Far East amounted to about 60 tons in 1922. What portion of this came to the United States is not clear. Dependable records, however, show that this country alone received over 2,000 tons in 1924, and imported at a somewhat higher average annual rate during the period from then and ending with 1927. During the following five years a new and higher level of imports prevailed at an annual average of near 4,500 tons. Then followed a marked upward trend wherein each succeeding year established a new level of imports as follows: 1934, 14,638 tons; 1935, 15,179 tons; 1936, 22,234 tons; and 1937 bids to exceed 25,000 tons.

Evaluating Future Importance

It may well be asked: What does all this probably mean? And the question may well be answered with the actual predictions of men (names withheld) importantly associated with rubber, that the industry of 10 or 12 years hence will be very largely a latex industry. The question then naturally arises: Why all this revolutionary changeover of long established practice, particularly when consideration is given to the fact that a substantial differential must exist in the price per pound of rubber in the form of latex as against that of a pound of smoked sheets? Perhaps the answer is not too unlike that of the automobile versus the buggy—it costs more, but it's worth much more than the difference in cost. At least the public has so ruled. People don't even think of automobiles in terms of buggies today although they did during the period of transition from the one industry to the other.

Latex now must be evaluated in terms of traditional crude rubber measurements and habits. In so doing, even with the present status of the knowledge of latex compounding and ingredient development, tensile, tear resistance, modulus, aging, and electrical properties can be obtained of a degree higher than is possible with masticated rubber. In the case of the latex article the rubber exists in approximately the protected state of its occurrence; whereas in case of the conventional article the rubber base has been subjected to the expensive and cruel, if not actually the crude, punishment of mastication as an indispensable means of preparing it to receive the necessary compounding ingredients, as well as to prepare it to be fabricated into finished product.

There is certainly no intention here to imply that all latex compound characteristics are better than or even equal to like ones of masticated rubber compounds. By far the most prominent exception is that of wear resistance. Carbon black does not reenforce latex compounds; therefore the application of latex to tire treads must rest, temporarily at least; how long, no one knows. It is quite freely predicted, however, that latex reenforcing agents will be found, and that perhaps in the not too distant future.

Without going further with this line of thought it would seem logical to explain the rapidly rising industrialization of latex on three counts: (1) the relatively high degree of knowledge now existent, and the rapid increase in the numbers of persons informed regarding latex and its behavior; (2) the general superiority of latex product quality; and (3) the comparative simplicity and versatility of manufacturing procedure.

Gelling Latex Widens Applications

The aforementioned growth of the industrial use of latex becomes all the more remarkable when consideration is given to the fact that processing limitations have restricted the successful application of latex until very recently to classes of products which are characterized prominently by thin walls and relatively regular surface contours.

Variations of processes known as "dipping," "electrical deposition," "spreading," "extrusion," and "porous mold deposition" have accounted for all latex consumption activities to date with but slight exception. Within the thickness limits to which these processes apply latex products of ever-increasing variety have been developed and marketed with immediate and lasting public acceptance.

The field of thick, massive irregularly shaped rubber products, which includes the major volume items, has not been invaded by latex until very recent years because the previously mentioned processes do not permit of the

practical fabrication of such classes of articles in the first place, and they could not be dried without shrinkage distortion in the second.

Such rubber products can be contemplated commercially from latex only when the latex is subjected to a process which will produce solidification or gelling regardless of mass or shape at the will of the operator. The resulting solid, too, must be sufficiently tough to permit handling without permanent distortion. The solid must be of an internal texture, which will cause expulsion of the contained water and the simultaneous uniformly regulated condensation of the latex compound solids into a dense non-porous mass of the same shape, but of proportionately smaller size than that existing when solidification was effected.

The unique contribution of the Kaysam process to the latex manufacturing art is based entirely upon these briefly expressed essentials. In practice these necessary characteristics are accomplished by the addition of certain sensitizing or gelling agents to suitably prepared latex compounds, which then acquire the disposition to be converted to a jelly-like solid mass upon attaining a degree of temperature characteristic of the particular mix.

Many chemical compounds are known which bring about the solidification of latex mixes to gel formations. The conditions attending the solidification reaction as well as the nature of the resulting gel structures vary widely, thus placing commercially impracticable limitations about the majority of the presently known gelling agents.

The gelling agents of the Kaysam process, prominently ammonium nitrate and zinc ammonium nitrate, are distinctive among known gelling chemicals in that they permit obtaining at one time three industrially important conditions: (1) stability of a working supply of the sensitized latex compound; (2) a definite control of the Critical Stability Temperature ranging from room temperature to slightly under 100° C.; the Critical Stability Temperature (C.S.T.) is that temperature above which a particular sensitized latex mix ceases to be fluid; and (3) a uniform textured continuous two-phase gel structure, which will synerese and shrink positively and proportionately in all unrestricted dimensions.

Latex Compounding and Sensitizing

In general latex compounding proceeds in about the same fashion for Kaysam as for other processes. The particular point of difference is with respect to those considerations that affect the sensitizing properties. A stabilizer may be defined as a substance which renders latex more resistant to coagulating influences. Most stabilizers are effective in increasing the mechanical or agitation stability of latex, but differ widely in their effect on the chemical stability. Materials known by the names Darvan, Emulphor O, Aquarex D and F, Casein, etc. impart high chemical stability; whereas such materials as common soap and sodium silicate do not. All types can be used, and with distinct advantage, but those of high chemical stability must be used in the least amount necessary to nullify the coagulation action of the specific compounding ingredients involved. In excess of this required amount the chemical type of stabilizer will nullify in part or in total the desired action of the sensitizing agent.

The characteristic stabilizing principles of the different types of commercial latices such as formaldehyde-ammonia, high soap, and ammonia alone must be taken into consideration when arranging the desired sensitivity of a mix for a particular product or manufacturing procedure. Latex serum also has its effect particularly in the presence of zinc compounds; consequently adjustments of sensitizing procedure must take into consideration the latex concentration and purity. Normal latex naturally has an abundance of serum; whereas repeated centrifuging or creaming concentrating operations progessively change this situation.

The pH relations are also very important with Kaysam gelling agents. The addition of ammonium salts reduces the pH. The greater the amount added, the greater the pH reduction, although it rarely exceeds 2 pH units. The lower the pH of the latex used, the more readily it is set. In general each concentration of setting agent produces in a given latex compound a definite characteristic reproducible C.S.T. It is important to have these conditions in mind when experimenting with the Kaysam process if successful results are to be expected.

Theoretical Gel Structure

Not too much is known about the Kaysam gelling mechanism and structures, and such as is known is another of the many cases in rubber history where scientific explanation follows the practical accomplishment. Such theory as seems to have some basis of proof will be given briefly to prepare for a better understanding of why gelled products act as they do in the practical operations to be described presently. When a mass of sensitized liquid latex compound reaches its Critical Stability Temperature, it immediately and completely solidifies into an irreversible gel of exactly the same volume and shape as when liquid. This gelled object is soft, but firm and tough enough to be taken from its container and handled at once with just reasonable care. Water freely and continuously exudes from its entire surface, and it reduces in size, but uniformly and proportionally so, and with reasonable rapidity to a certain point.

These phenomena are undoubtedly due to the particular structure of the solids in the gel formation. When liquid, the suspended solid particles are darting about in Brownian movement and continue so doing because of the repellency each has for the other in this stabilized condition. Upon heating to the Critical Stability Temperature the stability of the mix is reduced by the action of the sensitizing agent in such a manner and to just such an extent that the repellency is modified to allow particles in head on collision only to cohere. Lateral less violent impacts are repelled. Thus reticulated, chain-like formations occur, and these in turn bridge to form hollow squares, so to speak; then further bridging forms hollow cubes, and so on until the entire mass is a uniform textured open network of solids, the interconnecting interstices of which are completely filled with water. Here then is the two-phase gel in which both the solid and the liquid phases are continuous throughout the mass.

Immediately upon the completion of this structural formation the solid phase begins universally contracting, thus seeking a condition of minimum packing. The meshes of the net are forcibly shrunk in size and in so doing exert force on the contained liquid, thereby causing it to flow or synerese from the mass. The dependable uniformity with which this procedure goes on accounts for the uniformity of shrinkage in all directions. Whether in air or submerged in water, the shrinkage of the gelled article proceeds at about the same rate until about 50% of the contained water is eliminated, but not throughout the first or "surface evaporation" stage of drying. Incidentally at this point the gel is very tough and dense. The second stage of drying, the "internal diffusion" stage, is admittedly difficult and time consuming. Research work to date is throwing interesting light on this particular phase, and the status will be made available in the near future

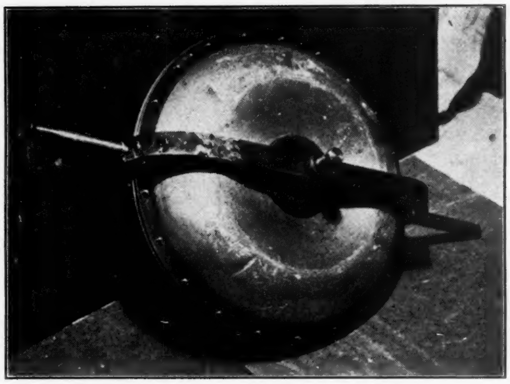
since it is a point of importance in all practical and experimental latex work.

Fabrication Procedure

The discussion of the general Kaysam fabricating procedures will begin with the assumption that a sufficiently thorough understanding prevails regarding the simple equipment required for preparing latex compounds; also that the procedure of making and sensitizing latex mixes for use in the Kaysam process is at least generally comprehended. Almost every conceivable article that has been or may be made by the Kaysam process will because of its type automatically aline itself into one or more of three general fabricating procedures.

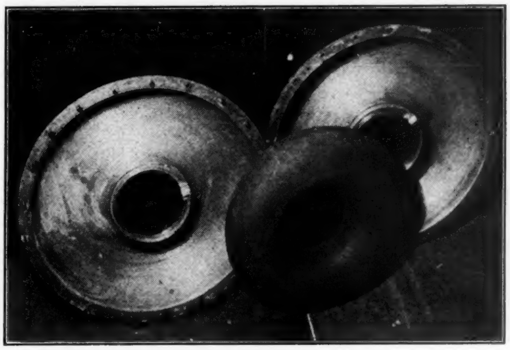
Hollow Articles

First, hollow articles such as balloons, balls, dolls, toys, bulbs, bags, etc. are made best by the "rotation method." In this a two-piece aluminum mold with suitably designed and engraved cavity wall is filled in the bottom half with a predetermined volume of sensitized latex mix, and the top half clamped into position. This assembly is then fitted into the arbor of a simple mechanical device which revolves the mold on one axis circumferentially about a drive shaft and simultaneously turns it laterally on a second axis by means of gears or sprockets and lugs. The drive shaft bearings are on the opposite sides of a tank at about water level height. During each slow revolution—about 8 r.p.m.—the mold is submerged in water at 90 to 95° C. As the latex mix slowly flows about every point of the cavity surface, it becomes progressively heated to its C.S.T. and remains there in gel form. The time required for complete gellation, of course, depends upon numerous factors such as mold thickness, Critical Setting Temperature of mix, and quantity, and usually three to five minutes are sufficient. Slight additional time brings about very rapid toughening, and this possibility is often advantageously employed. The mold is then cooled by spraying with or submerging in cold water, after which it is opened and the hollow air-containing article dropped out either in a tank of water or on a soft cloth tray where syneresis and drying begin. In case of articles such as balloons or beach balls, the gel is immediately inflated to desired size, then allowed to proceed in drying.

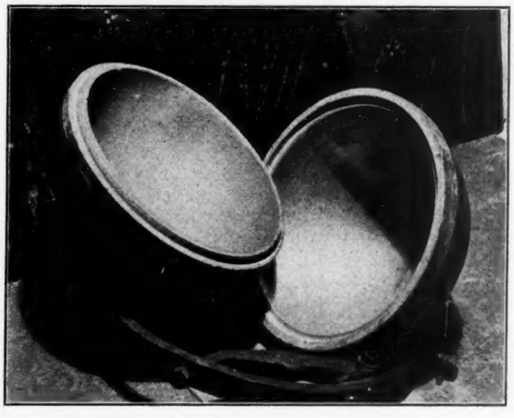


Mold for Flattened Ball-Type Hollow Article with Attachment for Dual-Axis Rotation

Flattened Ball-Type Mold—Open



One Type of Tube Mold



Spherical Hollow-Article Mold with Closing Mechanism

Semi-Hollow Articles

The second general procedure applies to such semi-hollow articles as boots, shoes, baby pants, band tubing, nursing nipples, etc. requiring suitably designed mold cavities with properly registering cores. The mold cavity simulates the exterior of the article while the core simulates its interior. Access to the space between the two is provided by pour and air vents. Sensitized latex is added to fill completely the space; then the assemly is lowered into hot water for a few minutes for gelling to be effected. Subsequent operations are the same as for other articles except in this case the core is used as a support during the subsequent drying and curing operations.

A variation of this method can be used to advantage with certain types of articles where design permits. This consists of placing a predetermined amount of the latex compound into the empty mold cavity and subsequently lowering the core into fixed and proper position, thus displacing the liquid to fill completely the desired space.

Solid Articles

The third procedure concerns such articles as solid balls, disks, stoppers, wall plugs, pedal rubbers, etc. The method in this case is the same as with semi-hollow articles except the core is absent and the cavity is completely filled before heating. In handling these gelled articles during the early stages of drying, as is also true with hollow articles, a specialized technique must be determined for each article that will prevent localization of pressure and subsequent misshaping due to its own weight.

Perhaps it is well to observe in passing from these three general procedures that variations of each and combination of two or more can be utilized to produce some rather spectacular results because of the cohesive nature of the freshly formed

gels. For instance, pneumatic cushions can be made from newly gelled balls by merely die punching a disk from the two opposite sides in a single operation, thus seaming the cut edges into an integral wall. Semi-spheres can be cast by the solid method, and upon removing the inner half of two identical molds the outer sections containing the semi-spherical gels can be registered in such a manner that the contacting gel edges will cohere to form a perfect sphere.

Drying

Little more likely needs to be said about the drying operation beyond stating that the early stage should not be forced too rapidly by elevated temperatures, particularly in case of massive articles. Moving air currents at slightly higher than room temperatures will terminate the first stage of drying in a very reasonable time; the second stage requires heat, but it seems now, also the presence of high humidity.

Vulcanization

One distinct advantage of latex compounds resides in the fact that low temperature accelerators seem to meet every requirement of quality. They can be used quite universally as mill scorching is not a factor. Aside from the simplified equipment, hot boxes and heated tunnels necessary for such cures as compared with that required for conventional rubber, the curing operation usually becomes merely the final stage or a continuation of the drying operation and is therefore subject to complete mechanization.

Molds

Non-porous molds are used exclusively. Any non-corrosive metal is suitable, but for reasons of economy as well as rapidity of heat transmission aluminum is preferred. Ordinary aluminum castings are to be avoided in particular work since much difficulty is sure to be encountered with porosity if machining is necessary. Forged aluminum castings are ideal. While quite expensive because of die cost, if numerous molds of a given kind are required, this is of subordinate consequence as compared with the utility of such equipment. It is advisable usually to make one or only a few molds of a kind by machining directly from bar stock.

Kaysam molds must be designed of a size larger than the required article by an amount equaling the ratio of solids to total mix. This can be determined with mathematical accuracy for an article without inserts where shrinkage is unrestricted. If, however, fabric or metal inserts are used, the shrinkage is restricted; consequently the mold must be designed to compensate for this condition. The only method to employ in this case is that of trial, error, and adjustment. Replicas, however, are dependable.

In conclusion it seems fitting to state that new as the Kaysam process is, its applications are numerous and several of them quite remarkable. Such work as has been done in this country during the past two years, and it has been quite intensive, shows clearly that the surface has been scarcely scratched.

Simplified Automatic Combustion Control

THESE sketches show a practical method for automatically regulating valves, dampers, fans, stokers, and the like, for maintaining constant steam boiler pressure.

Gas Fired Boiler

Figure 1 is a general hook-up view showing the sensitive regulator which virtually "weighs" the steam pressure in the boiler. When the pressure is too high, a plunger immediately moves upward and automatically adjusts the damper, shown in the sketch, and the gas control valve, this boiler being fired with natural gas. Note the "weighted lever valve" on the gas line, which is an ideal arrangement for the purpose, making operation certain in both directions. The weight closes the valve when the regulator plunger rises. As soon as the steam pressure starts to drop, the regulator plunger moves downward and re-opens the gas control valve and the damper.

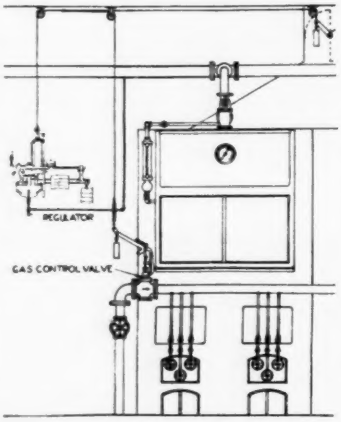


Fig. 1

Oil Fired Boiler

Now, for an oil fired boiler, instead of the lower portion of Figure 1, let us substitute Figure 2. This gives us an excellent arrangement for controlling an oil fired boiler with steam atomizing, the oil control and steam atomizing control valves being operated simultaneously by the same weight and by the same chain to the regulator.

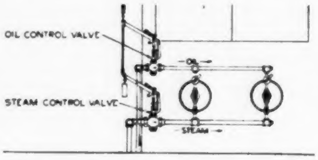


Fig. 2

Coal Fired Boiler

Figure 3 shows how the stoker of a coal fired boiler is similarly regulated, and Figure 4 shows how the same method is applied to the fan of a coal fired boiler. All of these devices pertaining to a given boiler can be operated simultaneously, if desired, from the same mechanism which is controlled and operated by the regulator.

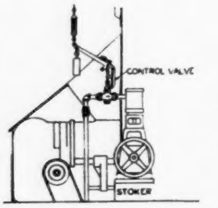


Fig. 3

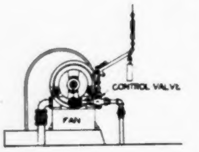


Fig. 4

This method is applicable to high or low pressure boilers and is particularly valuable on boilers in which the pressure is too low for assured self-manipulation. The regulator shown here is hydraulically operated and is not dependent upon steam pressure. Additional electric motor control actuated by boiler pressure is eliminated.

Rubber Flooring Manufacture in Finland

W. von Denffer [1]

MORRIS is right in prognosticating a great future for rubber flooring if not only the heavy type in tiles is considered, but chiefly the type in rolls for household requirements where mass production methods can be employed.

We have not yet reached the point where the price of rubber flooring is equal to that of linoleum, but it is possible that this condition can be attained. The development of rubber flooring is in its infancy; while the production of linoleum has long since achieved technical perfection enabling manufacturers to produce goods that are up-to-date and durable both in quality and color. Linoleum manufacture, aided by years of research and development, has become a specialized mass production industry. Thus linoleum has been able to find a secure position in the flooring market. The production of rubber flooring, on the other hand, has been largely limited to factories producing a number of other rubber products where large-scale production and intensive research on this product have not been given the necessary attention. Through antiquated manufacturing methods and improper laying rubber flooring has fallen into discredit.

However rubber flooring has many advantages over linoleum; for example, brighter colors and better mottling effects can be obtained. Linoleum requires much time and space for manufacture and is accompanied by a long lapse of time before the goods are ready for shipment and sale.

UPON reading in the October 1, 1937, issue of INDIA RUBBER WORLD, E. Morris' article on "Rubber Flooring in Rolls," Mr. von Denffer, of Nurmi, Finland, submits to our readers some of his observations which have resulted from 12 years' experience specializing in the manufacture of rubber flooring of the tile and roll types.

Mr. von Denffer says, "As rubber flooring is still in its infancy, but has a great future, it is important to interchange ideas and practical experiences through a professional journal."

His action in offering the benefits of his research on this fertile subject is to be very highly commended, and future discussion of the accomplishments and possibilities of development of this potential outlet for large amounts of rubber is invited through these columns.

Present Compounds

Rubber flooring today is still largely being produced by old methods with compounds that are entirely unsatisfactory. In general the formulas contain a high rubber content, and with a low sulphur content are slow curing. Other compounding ingredients used to excess include reclaimed rubber, chalk, mineral rubber, tar, paraffin, ceresin, and montan wax. The high rubber content allows for considerable stretching, and through continued use the rubber flooring creeps and becomes loose from its ground base. When the flooring is washed or cleaned with acid, the chalk filler ($CaCO_3$) dissolves leaving the surface rough at first and finally porous and soft. Reclaimed rubber causes softening; while tars and mineral rubber stain, thus destroying the colors. Paraffin, ceresin, and montan wax migrate to the surface where they impart a dullness to the colors and retain dirt so as to make cleaning difficult. The long curing time decreases output, necessitating a larger plant and many machines which increase the cost.

Recommended Compound Improvement

To obviate the above undesirable characteristics, the compound should be changed to contain no reclaimed rubber, tars, mineral rubber, or the aforementioned waxes. In addition, compounding should provide for a short curing time at high temperatures. The rubber content should be lowered and the compound should be formulated so as to obtain a hardness of 95 degrees (Shore Durometer) on the finished product. Care must be taken to provide for abrasion resistance in the finished stock. As a rule, this quality is improved when either very small or very large amounts of fillers are employed.

The stocks are preferably mixed in an internal mixer, using separate mixers for light and dark stocks. Mills should be avoided, for the powdered ingredients, especially colloids, fly and settle on the stock.

Processing in Finland Plant

The methods discussed below have been used successfully in Finland for the production of rubber flooring in rolls for household use. The plant engaged in this production is on a weekly schedule that calls for continuous production from 11 p.m. Sunday to 10 p.m. the following Saturday.

The ingredients are weighed out and to reduce mixing time and power consumption are placed into hot air chambers for heating. After this preheating the ingredients are mixed on heavy rolls (800 by 400 mm.) and then put through a machine of special construction which produces a thin sheet having a fine mottling. The thin sheets are

[1] Manager of rubber flooring branch of the Suomen Gummitehdas O/Y Co., with plants at Nokia, Savio, and Nurmi, all in Finland.

hung in refrigerated chambers for cooling, after which they are doubled and flattened out between chilled rolls under slight pressure. The doubled sheets are suspended in a hot air chamber near the calender. The mottling at this point is very fine and evenly distributed.

Calendering

The calender is a two-roll or three-roll precision machine with variable speed. Three rolls are used for single colors; while two are used for mottled sheets. If three rolls are used for mottled work, the last roll will damage the mottling. Each type of stock has its own calendering conditions of temperature and speed. In general, however, the calender temperature should be only moderate.

The rubber flooring is composed of three layers: the top layer is mottled; while the middle and bottom layers are of single colors. Thus, for example, in producing a flooring that is to be 3.2 mm. thick, the top mottled layer is calendered to one mm. thickness; the middle layer, containing uncured waste and of a single color, is made one mm. thick; and the bottom layer, also of a single color, but containing cured and finely ground waste, is drawn out on the calender to a thickness of 1.2 mm.

After calendering, a powdering machine powders the lengths on one side. It is also important that the compounding has been such that the stock will not stick together. This precaution eliminates the necessity for using expensive liners in the calendering process.

Vulcanization and Finishing

The continuous drum process is used for vulcanizing. As explained by Morris, the steam vulcanizing pan or press curing methods are not adaptable to the production of rubber flooring in rolls. However there are still a few disadvantages to be overcome in the continuous drum process. For example, the tension and conveying belts used in this method wear out quickly. Also, while it is true, as Morris said, that the low pressure on the flooring during this curing process is satisfactory for vulcanization purposes, this applies only to single layers. When three layers are to be plied and cured together by this process, the pressure is insufficient to exclude air pockets and to produce good adhesion between the layers as well as between the bottom layer and the jute duck base.

The author modified the process by doubling the speed of the drum vulcanizing machines, partial curing being obtained. Arrangements have been made for complete curing afterward. This process has been found to be as economical as the former method.

After vulcanization the mats are finished with a wax emulsion that is obtained from America. This finish, which imparts the desired luster to the flooring, withstands washing and prevents blooming.

In general this type of work demands, in order to be economically successful, mass production methods, up-to-date machinery, and cheap power.

Rubber Tiling

In the same factory rubber tiles are produced. The tiles, which are 500 by 500 mm. square and 4 or 6 mm. thick, are made from the same compounds as the rubber flooring rolls. The finished product, however, is somewhat harder owing to the increased pressure obtained in press curing. After compounding and mixing, which are done on the same mixers used for roll flooring, the tiles are vulcanized in a 12-platen press with a platen area 600 by 600 mm. The molds used are light in weight. In each daylight, a plate 3 mm. thick and 600 mm. in width extends beyond the press for preheating the molds. While the press is in use, duplicate molds are filled and placed on these warming plates. Thus when the press is opened, the filled and warmed molds are pushed into the press, only ten seconds being required for changing the 12 molds. In this way production on the press is materially increased. After the tiles are cured, they are buffed with a sandpaper abrader to a uniform thickness which is necessary to produce a smooth top surface when the tiles are laid.

Practical experience has shown many details that are important, but only a few of the most prominent observations have been presented in this brief discussion.

Contributors

(*Continued from page 42*)

indicative of a positive conviction as to the future possibilities for increasing the usefulness of rubber beyond its present status. The discovery of vulcanization and the advancement in application and quality of rubber products to the present standards have been made possible by concentrated investigation along avenues pertaining to chemistry, compounding technique, and observations as to physical performance of the products. While major expansion has taken place during the last 25 years, who among us is willing to prophesy that equally greater heights will not be reached in the near future? Most laudable contributions to this growth have been the result of the persistent research and dissemination of information by those who provide compounding ingredients for the rubber manufacturer. Their continued efforts deserve a full measure of appreciation for the assistance which they render.

Lecithin in Rubber Manufacture[1]

For many industrial purposes phosphatides possess high utility. One of the largest users is the rubber industry, where lecithin serves as a medium for facilitating the incorporation with the rubber of such difficultly miscible materials as carbon black and zinc oxide. Also in the leather industry lecithin has established its place in face of competition from the widely used sulphonated oils.

The phosphatides are bodies which contain organically combined phosphorous, are of a fat-like nature and therefore are saponifiable. They are soluble in most organic solvents such as ether, light petroleum spirit, and benzene, but are insoluble in acetone and ethyl acetate. The phosphatides can be divided into a number of sub-groups, of which two only, the lecithins and the cephalins, have at present technical importance. Lecithins are completely soluble in alcohol and contain a choline group, while the cephalins are insoluble in alcohol and contain a cholamine group.

The phosphatides are present in all naturally occurring organic substances, particularly in those cases where the substance is the reserve foodstuff for, or the germination center of, the next generation in the animal or plant. The most important commercial source of the commercial phosphatides is the soya bean, which contains 2% of which 25% is recovered in practice.

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[1] Abstracted from a paper by B. Rewald, in *Chem. Ind.*, Sept., 1937, pp. 253-54.

Sponge or Expanded Rubber

Joseph Rossman

A PATENT survey of United States patents on sponge and expanded rubber published in 1930 in INDIA RUBBER WORLD[1] included 111 patents granted between 1869 and 1929. Since that time accelerated expansion has been made in the use of cellular rubber in connection with the automotive, refrigeration, insulation, flotation, and other fields. This unusual adaptation has been made possible very largely by the fact that 84 additional patents have been granted between January, 1930, and November 9, 1937. This and succeeding issues of INDIA RUBBER WORLD will present chronologically the abstracts of patents issued since 1929 and thereby make available a continuous record of the patents pertaining to this subject.

1. Mullen, 1,744,491, Jan. 21, 1930. A flush tank valve is made of a ball of spongy porous rubber and an impervious fleecy cotton coating.

2. Beckmann, 1,745,657, Feb. 4, 1930. This patent covers making microporous rubber from latex. The product is useful for manufacturing separators or diaphragms employed in storage batteries (accumulators), electrolytic vessels, and the like where the diaphragm or separator is required to offer a passage to the electrolyte without creating a high electric resistance. As the product consists largely of pure vulcanized rubber, it resists the action of all kinds of acids and other corrosive substances and is equally resistive against electrolytic action.

The following examples are given:

Example 1. To 100 ccms. of normal latex, being a watery suspension of rubber containing about 35% rubber in fine subdivision, are added 2 grs. of finely subdivided sulphur. To this mixture are stirred in 5 ccms. of a solution of magnesium sulphate saturated at normal temperature; this salt solution is diluted with 190 ccms. water. After the lapse of about two minutes (if the temperature be about 25° C.), the mixture thickens and after approximately 15 minutes is converted into an elastic jelly-like product. Before the mixture has set in this manner it is poured into suitable molds. The jelly is allowed to stand until it has stiffened; this action takes place after a few days. If stiffening is desired sooner, the jelly-like mass is immersed in dilute acid or in alcohol, which is subsequently removed by washing with water. The mass thus obtained is now vulcanized; the mold containing the mass or this latter by itself (after having been placed on a carrier as, for instance, fabric) is introduced in the vulcanization vessel where it is heated about 2½ hours at a pressure of 6 kgs. per ccm^2. Care must be taken to effect vulcanization either in air highly charged with water vapors or below water, the rubber product being completely covered by the water. The reason for vulcanizing in a water environment is that restraint of evaporation of the water, its retention in the mesh of the colloidal net of rubber, prevents collapse of the meshes of that net upon each other and conserves the mesh form while the curing process is going on and until that process has in the well-known manner altered the physical character of the rubber substance, rendering the rubber mesh form permanent and no longer liable to internal adhesions which, had they been allowed to occur before curing, would have altered the structural form of the rubber constituent of the jelly and destroyed the continuity of the water constituent enmeshed in the colloidal net.

Example 2. One hundred grams latex, to which have been added 12 grams flowers of sulphur and 30 ccms. of a 5% solution of calcium chloride to thicken the latex and thereby keep the sulphur in suspension, are exposed in a closed vessel to the action of sulphur dioxide gas introduced into the vessel to replace the air previously contained therein and to be superposed to the body of latex contained in the vessel, remaining in contact with its surface. The progressive transformation to a jelly-like form becomes initially manifest after a few minutes, provided the mixture be quite cool, say about 5° C., and after two to three hours the whole mass is converted into an elastic jelly which is then exposed to the action of heat and moisture for vulcanization.

Example 3. To a mixture of 100 grams latex and 6 grams flowers of sulphur are added 200 ccms. of a solution of 16.7 grams magnesium sulphate in 1,000 ccms. water. The mix is then exposed to the action of sulphur dioxide gas, and the jelly-like mass which results in this treatment is exposed to heat in the presence of moisture for vulcanization.

3. Felix, 1,752,295, Apr. 1, 1930. A cushion comprising sponge rubber with a fabric cover for the upper face integrally united to the rubber by vulcanization has perforations extending through the rubber and the fabric, has edge portions of the fabric turned down around edge portions of the perforations, and has the edges of the fabric embedded in the sponge rubber body.

4. Osborn, 1,756,380, Apr. 29, 1930. A rubber floor covering comprising a sponge rubber body has its top of open cellular structure presenting an exposed sponge rubber tread and has rind on its bottom and sides and a border united to the side rind; the border also has an exposed cellular sponge rubber top.

5. Genth, 1,765,666, June 24, 1930. Sponge rubber is made from a rubber mix containing 5% metaldehyde.

6. Untiedt, 1,777,945, Oct. 7, 1930. The process of making porous rubber comprises passing air into a body of latex containing a foam stabilizing agent, agitating the aerated latex to form a dense foam, and thereafter solidifying the rubber in the foam.

7. Miller, 1,778,270, Oct. 14, 1930. The method of forming a sponge rubber article comprises splitting a sponge rubber slab, to form a split-slab sponge rubber board, and superposing the split-slab board and another sponge rubber board, with skin on both the abutting surfaces, to form an intermediate reenforcement, and with cut sponge on the opposite faces.

8. Felix, 1,780,122, Oct. 28, 1930. A continuous process of molding sponge rubber articles comprises forming a strip of sponge rubber compound with a substantially non-extensible member embedded therein and drawing the strip through a heated die by putting tension on the embedded member whereby a strain is exerted on the un-

[1] Apr. 1, 1930, pp. 61-62; May 1, 1930, pp. 68-69; June 1, 1930, pp. 68-69.

expanded compound to push the softened and expanded rubber through the die.

9. Fisher, 1,786,563, Dec. 30, 1930. Example 1. To make a hard cellular composition, masticate upon a rubber mill 100 parts by weight of rubber and add during mastication 7.5 parts of phenol sulphonic acid and 30 parts of sulphur. The order of mixing is immaterial. When these ingredients have been dispersed through the rubber, the mass is heated for about five hours at a temperature of about 300° F., and the mixture, either unconfined or disposed within a mold during the heating, is allowed to spread out and expand. There results a strong, hard, cellular material light in weight and having a gravity of approximately 0.35.

Example 2. A hard cellular composition may be produced in the following manner. Mix into 35 parts by weight of rubber, upon a rubber mill or otherwise, 20 parts of a high grade of reclaimed rubber, 25 parts sulphur, 5 parts hard rubber dust, 3 parts cottonseed oil, 6 parts pine tar, and 6 parts concentrated sulphuric acid (specific gravity 1.82). When these ingredients have been thoroughly and intimately admixed, heat the mass under such conditions as to permit a substantial volumetric expansion thereof. Where the above mix is placed in a mold or between spaced plates which permit a 200% volumetric expansion and is heated for 90 minutes at an oven temperature of 324° F., a cellular product having a gravity of about 0.35 results.

Example 3. The following procedure has been found to give soft cellular products. Into 70 parts by weight of rubber, add 6 parts of phenol sulphonic acid, 10 parts of sulphur, 5 parts of nitrated rubber, and 9 parts of hard rubber dust, a thorough admixture of the ingredients being obtained by any suitable mixing operation; then place the batch in a mold of a size to permit a volumetric expansion of the mass of approximately 200% and heat for 60 minutes at 324° F. The resulting product is a soft, flexible sponge or cellular material.

Example 4. Similar cellular products may also be obtained by milling sulphur and a blowing agent into a rubber isomer and subjecting the mass to heat. Thus, take 100 parts by weight of a rubber isomer (previously prepared by reacting 7.5 parts by weight of phenol sulphonic acid and 100 parts of rubber) and mill thereinto 25 parts of sulphur and 20 parts of sodium bicarbonate. The batch is heated in a container permitting a 100% expansion for 90 minutes at 324° F. A hard strong cellular material results.

10. Wilderman, 1,791,437, Feb. 3, 1931. To make porous ebonite bodies bring particles of ebonite coated with uncured ebonite into a mold having a greater volume than the aggregate volume of such particles and vulcanize it until an integral porous body is obtained while its volume is maintained substantially constant.

11. Vernet, 1,814,197, July 14, 1931. The method of cutting a flat bottomed recess in a block of sponge rubber comprises compressing a block of such material around a restricted closed area to cause a portion of the block to project, causing relative motion between the block and a cutter along a line at an angle to the plane of the cutter, and cutting the projecting portion of the block while applying pressure thereon on the face opposite and projecting portion and in greater degree on the side initially toward the cutter.

12. Wilderman, 1,815,959, July 28, 1931. The process of making porous filters, diaphragms, and the like from powdered, partially vulcanized rubber mixtures comprises distributing the powder in a mold while the powder is at a temperature such that it remains in a state of fine subdivision, compressing the powder to form the article, and thereafter rapidly raising the temperature to cause the powder to combine to form a strong porous body.

13. Cornic, 1,816,764, July 28, 1931. A process of manufacturing artificial sponges of rubber comprises first mixing 100 parts of latex with one part of an organic base of the guanidine series, 5 parts of sulphur, 4 parts of zinc oxide and water, then adding to the mass 12 parts of ammonium carbonate in the powdered state and finally heating the whole to a temperature of about 140° C. for a period of one to three hours.

14. Battilani, 1,818,372, Aug. 11, 1931. Cellular rubber having air in the cells at more than atmospheric pressure is made in an apparatus comprising an airtight container, valved pipes for admitting compressed air, means for bringing the contents of the container to a liquid state, perforated baffles for agitating the mixture while the compressed air is being admitted, and means for forçing the mixture from the container.

15. Madge, 1,819,647, Aug. 18, 1931. A process of manufacturing microporous articles of vulcanized rubber from aqueous dispersions without gelling electrolytes comprises depositing rubber material from an aqueous dispersion and vulcanizing the deposit under water and at a pressure sufficient to prevent evaporation of water from the pores.

16. Richert, 1,823,335, Sept. 15, 1931. The method of forming cells in rubber during vulcanization consists in introducing into the rubber during plasticization thereof a sulphite of ammonia and then subjecting the rubber to sufficient temperature to decompose the sulphite of ammonia and vulcanize the rubber.

17. Weamer, 1,827,127, Oct. 13, 1931. The method of making ornamented sponge rubber sheets comprises applying to a foundation sheet of sponge rubber composition a smaller plastic ornamenting sheet backed by a removable protector overlaying the two with a cloth molding sheet, vulcanizing the foundation sheet against the cloth sheet, thereby embedding the ornamenting sheet in the face of the foundation sheet, removing the molding sheet, and then removing the protector.

18. Geyer, 1,828,365, Oct. 20, 1931. The method of making heat insulating slabs comprises vulcanizing a rubber composition into a highly blown cellular structure without regard to the uniformity of the resulting shape or size of such cellular structure, dividing the cellular structure into relatively small particles, applying a molten bituminous binder to the particles to form an adhering mass, then molding the mass into desired form in shaping molds, and permitting the binder to set and harden.

19. Trobridge, 1,828,481, Oct. 20, 1931. A process of forming integral molded masses of sponge structure comprises forming a concentrated vulcanizable rubber material into a froth, forming the froth to the required dimensions, enclosing the masses in a heating fluid at a vulcanizable temperature, and conveying the heating fluid through the masses in closely spaced parallel paths.

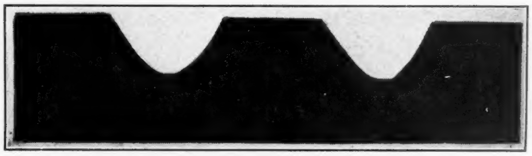
20. Beckmann, 1,831,406, Nov. 10, 1931. A rubber diaphragm for use as a separator in electric storage batteries comprises a vulcanized rubber gel body of considerable flexibility and substantially undeformed reticulate structure permeated by pores of colloidal dimensions, which are uniform both in size and in distribution.

21. Davidson, 1,842,587, Jan. 26, 1932. A channel strip for glass windows comprises a soft sponge rubber body and a surface layer united therewith by vulcanization and consists of a dense soft rubber composition containing a lubricating material.

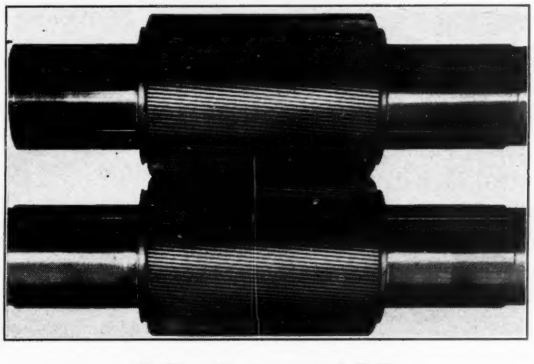
(*To be continued*)

Rubber Milling Improved by Steel Development

WITH the development of stiffer and tougher rubber stocks to meet new and special requirements it became necessary to improve mill rolls to overcome the resulting increase in roll breakage. As a result of earnest research, rolls of special alloy high carbon cast steel were developed which have practically eliminated breakage from the former 75% average.



Magnified Section of Corrugations



MacHempIte Corrugated Rolls

Early Chilled Iron Rolls

Originally mill rolls were of chilled iron made by casting molten iron into a cast-iron mold with a heavy wall which rapidly conducted away the heat from the molten metal in contact with it, thus acting as a "chiller." This rapid chilling caused the surface to harden, without giving the graphite a chance to come out of solution. The resultant high combined carbon content of the surface iron made the exterior very hard. Since the interior cooled more slowly, the graphite in solution formed into flakes with the result that the center mass was softer, but stronger than the carbon hardened surface.

As these rolls became worn, their surfaces were reground to the limitations of the hardened portion, thus making them unfit for further use. Also the rolls had the inalterable characteristics and limitations of cast-iron with its limited resistance to shock and extreme changes of temperature.

Development of MacHempIte Rolls

Among those who concentrated on this breakage problem was the Mackintosh-Hemphill Co., Pittsburgh, Pa., with a century of experience in roll making, and their engineers finally produced, in 1930, a type of roll that has withstood service in leading rubber plants.

In the first attempt toughening materials such as chromium, nickel, and molybdenum were added to the regular cast-iron mixture. This method increased the strength of the rolls, but breakage still continued. Finally the engineers put aside cast-iron entirely and concentrated on cast alloy steel, producing rolls of a special high carbon alloy known as MacHempIte. These rolls were then heat treated to from 45 to 55 Scleroscope hardness. The first rolls were installed, given rigid tests, and have been in service ever since.

Among the advantages found for the new rolls were a brighter and smoother surface finish than cast-iron, and lighter weight (1,200 pounds in the 84-inch size) because of the thinner walls. Because MacHempIte has a greater coefficient of thermal conductivity than cast-iron and because of the thinner walls, the efficiency of the water cooling system was increased, thus permitting of a greater load in service without danger of overheating the rubber stock.

A more recent development in the MacHempIte smooth rolls is the increase in the surface hardness from 45 to 55 Scleroscope to a hardness of 60 to 65, thus permitting them to be used on the front roll as well as the rear roll. Also this increase in hardness enables the rolls to withstand the action of cutting knives. These features provided for increased mill capacity and efficiency.

These smooth rolls offset their higher initial cost by insuring regular production and the handling of heavy jobs without fear of breakage. Smaller-size journals can be used, thus making possible the use of standard roller bearings.

Application to Corrugated Rolls

Following this success, MacHempIte corrugated rolls were applied to washing and grinding mills to replace cast- iron rolls which, although hard, were naturally brittle and broke or chipped easily. Owing to the contour of corrugated rolls, this natural brittleness of cast-iron is even more hazardous for corrugated than for smooth rolls.

These new corrugated rolls after casting are heat treated to their softest and strongest condition and then corrugated by machining. These corrugations are subjected to the Mackintosh-Hemphill "Wearprooft" process whereby the teeth are hardened to a 70 to 80 Scleroscope for a depth of $^3/_{16}$- to ¼-inch. The teeth of the new corrugated rolls satisfactorily resist breakage and chipping, and when the corrugations are worn off, the rolls can be machined and rehardened until the diameter of the roll reaches the danger point.

Entirely new conceptions of the art of milling rubber have arisen through the use of MacHempIte "Wearprooft" Corrugated Rolls in the rear position on rubber mills. These corrugations are small and somewhat of a sawtooth shape. One user reports that these rolls have permitted him to break down 30% more crepe rubber per mill-hour owing to the greater milling efficiency.

Founded in 1803, Mackintosh-Hemphill Co. first manufactured rolls in 1823 and at the same time introduced chilled iron rolls in America.

Editorials

Influences on Business

WHILE there are many significant conditions which justify a feeling of insecurity or question as to the future, underneath there is apparent a growing trend toward a saner economic and social foundation on which it is possible to build a healthy upward movement which can be sustained provided natural rather than artificial means are employed.

In general inventories are low in proportion to what they will be when it is possible to bring about a realization of the potential business which must become active as soon as favorable conditions exist. Because of the necessary curtailment of expenditures by individuals and business organizations during the past eight years there is a great need of replacement buying as well as a submerged desire for better things. The latent demand for fabricated articles presupposes a like requirement of raw materials. This pent-up eagerness will certainly develop into sturdy business as soon as the people are assured of dependable conditions that will produce a temperate and sustained increase in the individual income.

The comparatively low degree of recovery in the long period of eight years is not characteristic of post-depression periods in the past and in view of repeated history, indicates definitely that in the last few years a retarding influence has been at work. For the past four or five years the people have been told that the new and artificial methods being used would not only speed up recovery, but would eliminate depressions in the future.

This recent recession has disproved such to be the case and has had a sobering effect on the people at large and in turn on the legislators who have in their hands the power to follow a dictated policy or assert the judgment of themselves and their constituents. According to the law of averages which generally prevails, there is greater probability of rational judgment by the represented masses than by a few.

At present there appears a healthy sign in the fact that legislators have begun either to use their own individual judgment or are reflecting the opinions of those whom they represent. At any rate the net result is careful deliberation which signifies broad consideration rather than the previous hasty action based on an assumed mandate. This deliberate consideration of all phases before action is taken, not only tends toward sane legislation, but, if continued, it will have a stabilizing influence on the country as a whole.

Thus with the potential market for American goods and with the possibility of extended consideration for all factors connected with a prosperous nation it appears that our house is being put in order and that an enduring forward movement is likely to get under way in the near future.

The importance of constructive and unbiased consideration for all influencing elements must be recognized by the legislators if for no other reason than that experimentation and group preference have failed in five years to produce satisfactory progress.

Goodyear Celebration in 1939

IN accordance with action taken at the Rochester meeting of the Rubber Division, A.C.S., last September, the chairman of the division has recently appointed a committee for the purpose of making preparations for a suitable expression of the existing gratitude for the service rendered by Charles Goodyear in 1839. The celebration is to be held in connection with the general A.C.S. meeting scheduled for Boston in the Fall of 1939. It is particularly fitting that Boston has been chosen for this demonstration for much of Goodyear's activity was centered in New England near Boston, as also were located many of the prevulcanization attempts to use raw rubber in the production of footwear and clothing.

Although the designated date appears to be far distant much planning and discussion will be required before well formulated and detailed objectives can be adopted by the Rubber Division for execution as a demonstration of suitable magnitude.

Realization of a worthy program will require not only active effort on the part of the committee, but also eager cooperation from the individual members and business organizations which constitute the rubber industry. Because of the far-reaching influence of vulcanized rubber upon the every-day life of the world it should be possible to arouse widespread interest and through this medium impress upon the layman the importance of the rubber industry which provides the diversified products that signify service, convenience, and protection.

In order to insure the success of this undertaking each individual can well take it upon his own shoulders to create enthusiasm and to offer suggestions for consideration by the committee when consolidating the plans for this memorial to the man who contributed the nucleus around which the rubber industry has been built.

S. C. Stillwagon

EDITOR

What the Rubber Chemists Are Doing

A. C. S. Rubber Division Activities

Akron Group

THE Akron Group, Rubber Division, A.C.S., held its first winter meeting on December 3 at the Akron City Club, Akron, O., with about 250 members and guests in attendance. The meeting was addressed by F. O. Anderegg, Ph.D., who spoke on "Products of Fiberglas;" Fiberglas is a development of the Industrial and Structural Products Lab., Owens-Illinois Glass Co.

According to Dr. Anderegg, the degree of coarseness of the individual glass fibers which make up Fiberglas depends upon the intended use. In order to obtain fine fibers care must be taken in melting the glass, fining, and in using the proper type of steam blowing. Coarse fibers are used for air filters, fine fibers for insulation, and very fine fibers for textiles.

The application of Fiberglas includes electrical insulation, filters for corrosive liquids and gases, draperies, etc. While the electrical properties of glass are generally appreciated, other properties (resistance to moisture and high temperatures and ability to be spun into a very fine yarn and be woven into thin tapes) make Fiberglas well suited for insulation use in building coils and motors. Fiberglas, according to the speaker, has been found to be particularly successful for use as a chemical filter for corrosive liquids and for filtering dust from corrosive gases. When used in plate-frame presses, rubber is brushed on the Fiberglas where it contacts the frame. It was pointed out, however, that the rubbers which have been so far tried and which can be readily applied have not proved adequately acid-proof.

Diameters of textile glass fibers approximate 0.0002-inch with tensile strengths averaging about 300,000 pounds per square inch. The tensile strength increases appreciably with the decrease in diameter and somewhat with the increase in temperature of the glass before pulling. It has been suggested, according to Dr. Anderegg, that low tensile strength is due to discontinuities or imperfections present at the surface of the glass fibers; there is less probability for discontinuities to be present as the fiber becomes finer. In conclusion Dr. Anderegg pointed out that a challenge is presented by other materials which are giving relatively poor service chiefly because of the tremendous crudeness of their structures.

Chicago Group

THE CHICAGO Group, Rubber Division, A.C.S., held its annual Christmas Party-Ladies Night on December 10 at the Hotel Sherman, Chicago, Ill. More than 200 members and their ladies attended this gala affair. Prior to the dinner, a reception was held in the Blue Room and Rotary Room of the hotel. During dinner, which was served in the College Inn, the ladies were presented individual gifts by Santa Claus. In the absence of a technical program, the remainder of the evening was given over to dancing and entertainment.

This dinner-dance was made possible through the generous financial contributions of the following: The Akron Standard Mold Co., L. Albert & Son, American Cyanamid & Chemical Corp., American Zinc Sales Co., Anaconda Sales Co., Binney & Smith Co., Godfrey L. Cabot, Inc., Carter Bell Mfg. Co., Cleveland Liner & Mfg. Co., Continental Carbon Co., Rubber Chemicals Department, E. I. du Pont de Nemours & Co., Inc., General Atlas Carbon Co., Herron & Meyer, Kraft Chemical Co., Inc., Loeb Equipment Supply Co., Midwest Rubber Reclaiming Co., Monsanto Chemical Co., H. Muehlstein & Co., Inc., Naugatuck Chemical Division of United States Rubber Products, Inc., New Jersey Zinc Sales Co., A. Schulman, Inc., Thiokol Corp., United Carbon Co., R. T. Vanderbilt Co., Inc., Wishnick-Tumpeer, Inc.

Plans have been made for a meeting to be held during the first part of February. Those wishing to receive notices of Chicago Rubber Group meetings are requested to send their name and address to Ben W. Lewis, Wishnick-Tumpeer, Inc., Tribune Tower, Chicago, Ill.

Los Angeles Group

THE Los Angeles Group, Rubber Division, A.C.S., held its monthly meeting on December 7 with an attendance of 85. Music, gifts, prizes, and paper hats contributed to the spirit of the season. Officers for 1938 were elected at the meeting as follows: chairman, E. L. Royal, manager of the Los Angeles office of H. M. Royal, Inc.; vice chairman, Garvin A. Drew, Pacific Coast manager, A. Schrader's Son; secretary-treasurer, M. Montgomery, Los Angeles representative of Martin, Hoyt, & Milne.

The feature of the evening was a talk by Dr. William G. Campbell, of the University of Southern California who, having recently returned from the Orient, spoke on China and Japan.

After giving a background of the philosophy and history of both the Japanese and Chinese nations, Dr. Campbell showed some very fine colored movies of the two countries which, rather than emphasizing the sordidness and squalor of the Orient, brought out the beauty of the countries and the peaceful family life of the inhabitants prior to the beginning of recent hostilities. This was followed by some spectacular shots of the fighting in Shanghai as witnessed by the speaker. In conclusion Dr. Campbell mentioned some of the more significant points regarding the present conflict in the Far East.

Dinner favors, leather cases containing a whisk broom and shoe polisher, were given to each member present by Dr. Hutchinson, through the courtesy of Firestone. The raffle prize, a 20-pound turkey, donated by the Los Angeles Rubber Group, was won by the retiring chairman, T. Kirk Hill, of the Kirkhill Rubber Co. M. L. Paine, of Firestone, won the door prize of six neckties contributed by J. E. Tufft, of *The Rubber Age*. A young lady furnished accordion music during the evening. She was assisted by Bill Shawger, of the D & M Machine Works, who led the group in a few songs.

At the November meeting chrysanthemums were supplied for each table by W. C. Holmes, of the Dill Mfg. Co.

Boston Group

THE Boston Group, Rubber Division, A. C. S., will hold its next meeting on February 4 at the Fox and Hounds Club, Boston, Mass. At the meeting Roland D. Earle, of Angier & Earle, Inc., will present a paper on "Solvent Cements," and Jesse H. Mason, of Haartz-Mason-Grower Co., will review some of the many experiences he has had in the rubber proofing business. It is expected that one or two more subjects will be included in the program, providing a broad enough scope to make the meeting of interest to all.

New York Christmas Party

THE annual Christmas meeting of the New York Group, Rubber Division, A. C. S., was held on December 17 at the Building Trades Employers Association, 2 Park Ave., New York, N. Y. That the party was a definite success was evidenced by the capacity crowd of 370 members and guests present for the turkey dinner, entertainment, and distribution of gifts. An added attraction was motion pictures in color showing group members, generally dignified, at unrestrained play during the outing held last June.

Prosper E. Cholet, who recently returned from the Straits Settlements, spoke on "Recent Experiences at the Plantations." Mr. Cholet opened his talk with a discussion, illustrated by slides, of general rubber estate practices, emphasizing and showing the relation between the seedling and bud-grafting methods of planting. Following this, he devoted his attention to describing the properties and preparation of Essar, a modified rubber with a permanent plastic quality while unvulcanized. The preparation of this plastic rubber, which was described in detail, includes crumbing, vacuum drying, heating to a critical temperature in a non-oxidizing atmosphere, and cooling in a modified air of a controlled composition and temperature. Next the rubber is submitted to a plasticity stabilizing process. Mr. Cholet pointed out that the properties of better grades of rubber were influenced only when the cooling from the critical temperature was slow and in the presence of oxygen.

He presented charts showing the plastic and curing properties of Essar rubber as compared with standard grades. Mr. Cholet also mentioned the possibility of producing modified rubbers with various degrees of purity. In conclusion motion pictures were shown depicting native life and customs in the plantation areas.

Officers for 1938 were unanimously elected at the meeting as follows: chairman, C. A. Bartle, E. I. du Pont de Nemours & Co., Inc.; vice chairman, A. H. Nellen, Lee Tire & Rubber Co.; secretary-treasurer, Peter P. Pinto, *The Rubber Age;* sergeant-at-arms, R. E. Casey, Naugatuck Chemical; executive committee: for one-year terms, J. W. Crosby, Thiokol Corp.; W. J. Geldard, Fisk Rubber Co.; and J. H. Ingmanson, Bell Telephone Laboratories, Inc.; for two-year terms, C. R. Haynes, Binney & Smith Co.; E. W. Schwartz, General Electric Co.; and K. J. Soule, Manhattan Rubber Mfg. Division, Raybestos-Manhattan, Inc.; for three-year terms, D. C. McRoberts, Kaysam Corp. of America; R. Berkowitz, Metal Hose & Tubing Co.; and J. Ball, R. T. Vanderbilt Co. At a meeting of the executive committee it was decided to make the retiring secretary-treasurer, B. Brittain Wilson, of INDIA RUBBER WORLD, an *ex officio* member of the executive committee.

An unusually fine array of more than 200 valuable and useful gifts, made possible by generous donations of merchandise and cash, were distributed as prizes to holders of lucky tickets. Dinner favors in the form of Neoprene keytainers were presented to all through the courtesy of E. I. du Pont de Nemours & Co., Inc. Book matches for each table were supplied by H. M. Royal, Inc. Other donors were: Akron Standard Mold Co.; L. Albert & Son; Anaconda Sales Co., Pigment Division; Richard Best Pencil Co.; Binney & Smith Co.; Godfrey L. Cabot, Inc.; Callaway Mills; Carter Bell Mfg. Co.; Continental Carbon Co.; Curran & Barry; Farrel-Birmingham Co., Inc.; General Atlas Carbon Co.; Imperial Paper & Color Corp.; INDIA RUBBER WORLD; Kaysam Corp. of America; Monsanto Chemical Co., Rubber Service Laboratory Division; H. Muehlstein & Co., Inc.; National Sherardizing & Machine Co.; Naugatuck Chemical Division, U. S. Rubber Products, Inc.; New Jersey Zinc Co.; The Paracord Co.; Pequanoc Rubber Co.; Parrot Speed Fastener Corp.; Philadelphia Rubber Works; Rare Metal Products Co.; Revertex Corp. of America; *Rubber Age;* A. Schrader's Son; A. Schulman, Inc.; Henry L. Scott Co.; Somerset Rubber Reclaiming Works; Southwark Mfg. Co.; Stamford Rubber Supply Co.; C. J. Tagliabue Mfg. Co.; Thiokol Corp.; Titanium Pigment Corp.; United Carbon Co.; R. T. Vanderbilt Co., Inc.; Wishnick-Tumpeer, Inc.; and Flintkote Corp.

Detroit Group

THE Detroit Group, Rubber Division, A.C.S., held its first winter meeting and party on December 8 at the University Club, Detroit, Mich. H. Walter Grote, of the United Carbon Co., entertained the 105 members and guests present by perfoming sleight-of-hand with his usual dexterous skill. Fortunate ticket holders won the door prizes available for the occasion. The speaker for the evening was A. H. Brown, Jr., of the Detroit Edison Co., whose topic was "Rubber Springs."

Mr. Brown, in his talk, explained the basic physical concepts involved in the study of vibration under each of the following conditions: free vibrations without damping friction, free vibrations with damping friction, forced vibrations without damping, forced vibrations with damping, and the transmission of high frequency vibrations. According to Mr. Brown, steel as used in a coil spring has comparatively small internal friction and thus produces an almost negligible amount of damping. Rubber, however, when properly compounded, produces a relatively great amount of internal friction, resulting in greater damping. In some cases Mr. Brown believes this internal friction with its attendant heat generation is a detriment to rubber springs rather than an advantage. Also, he brought out that one of the chief reasons why rubber is superior to steel is because of its noise reducing ability which is due in greater measure to other phenomena than to internal friction. The resistance of rubber to the transmission of relatively high frequency vibrations is one of the factors responsible for the effectiveness of rubber springs in reducing noise. Future improvement in spring design, according to Mr. Brown, will depend upon the evaluation of the factors discussed. It is suspected that these improved designs may include combinations of rubber and steel, particularly for heavy machinery.

A. C. S. President

THE American Chemical Society on December 19 announced the election by mail ballot for president in 1939, of Dr. Charles A. Kraus, professor of chemistry and director of chemical research at Brown University. He took office as president-elect on January 1, when Dean Frank C. Whitmore, of Pennsylvania State College, became A. C. S. president for 1938, succeeding Dr. E. R. Weidlein, director of Mellon Institute of Industrial Research.

Goodyear Centennial Meeting

THE year 1939 will mark the hundredth anniversary of the discovery of the process of vulcanization of rubber by Charles Goodyear on which the development of the rubber industry was founded. This discovery was made in the village of Woburn, Mass., which is near Boston.

A. R. Kemp, chairman of the Rubber Division of the American ChemicalSociety, has appointed the following committee and advisory council to arrange a suitable program to be presented at the general meeting of the American Chemical Society scheduled for Boston in the Fall of 1939.

EXECUTIVE MEMBERS

Name	Company
J. M. Bierer, Chairman	Boston Woven Hose & Rubber Co.
C. R. Boggs	Simplex Wire & Cable Co.
W. B. Wiegand	Columbian Carbon Co.

ADVISORY BOARD

E. B. Babcock	Firestone Tire & Rubber Co.
E. R. Bridgwater	E. I. du Pont de Nemours & Co.
W. De Laney	Seamless Rubber Co.
R. P. Dinsmore	Goodyear Tire & Rubber Co.
W. A. Gibbons	U.S. Rubber Products, Inc.
B. Longstreth	Thiokol Corp.
A. T. McPherson	U.S. Bureau of Standards
T. Midgley, Jr.	Ethyl Gasoline Corp.
J. W. Schade	B. F. Goodrich Co.
H. E. Simmons	University of Akron
A. A. Somerville	R. T. Vanderbilt Co.

Rhode Island Rubber Club

THE fall meeting of the Rhode Island Rubber Club was held on December 3 at the Narragansett Hotel, Providence, R. I. Among the 129 members and guests present, according to E. L.

Hanna, president of the club, were the following guests from the Boston Group, Rubber Division, A.C.S.; J. T. Blake, G. W. Smith, E. H. Krismann, and A. R. Lukens. Activities for the evening began shortly after six o'clock with a bowling match; 42 participated in this event. A prearranged contest between six-man teams from Anaconda Wire & Cable Co. and the Davol Rubber Co. resulted in a victory for the former.

Following the dinner, which was started at eight o'clock, Mr. Hanna introduced Robert Wishnick, who presented the Wishnick Golf Trophy to the Anaconda Wire & Cable Co. The trophy, a gift of Wishnick-Tumpeer, Inc., 295 Madison Ave., New York, N. Y., was accepted by F. E. Rupert in behalf of the Anaconda team. The bowling prizes, which were then distributed, were won by the following: C. Mackey, Anaconda Wire & Cable Co., high single string, 129; B. Stark, Anaconda Wire & Cable Co., second high single string, 124; J. Selton, American Zinc Sales Co., high three strings, 330; J. Stevens, Davol Rubber Co., second high three strings, 301; and Arthur Davis, Goodyear Footwear Corp., received honorable mention for bowling 121 in a single string, having bowled only two strings.

The first speaker of the evening, W. F. Tuley, Naugatuck Chemical Division, United States Rubber Products, Inc., Naugatuck, Conn., presented a discussion on the subject "Why Modern Accelerators?" Dr. Tuley briefy traced the history and the development of accelerators from the time of their origin in 1839, through the discovery of organic accelerators by Oenslager in 1906, up to the present period. The modern trend in the development of accelerators is based largely on research as to the effect of various combinations of accelerators. Following this Dr. Tuley discussed the more important phases of accelerator usage: dispersion, particle size, scorching, frosting, and plasticizing effect on rubber. The T-50 test, as used for the evaluation and study of accelerators, was discussed in greater detail. According to the speaker this test is based on the fact that the loss in elasticity produced in rubber at sub-freezing temperatures is a measure of the degree of vulcanization. Thus, the T-50 has found many uses in development and control testing. For example, the exact ratio of one accelerator to match the rate of cure by another in the same stock can be determined by this test. In view of the importance of other compounding materials in vulcanizing Dr. Tuley pointed out that the T-50 test may also be used to determine the effect of antioxidants, softeners, and pigments which are difficult to estimate by other methods. In conclusion Dr. Tuley stated that it has been a long time since a new chemical class of accelerators has been discovered and that we are now apparently in the stage of improvement rather than discovery.

"Tuss" McLaughry, coach of the Brown University football team, showed some interesting moving pictures of the Rutgers-Brown game played on Thanksgiving Day and made numerous instructive comments regarding individual plays. To conclude the evening's program, Al Lukens, from the Boston Rubber Group, showed slides of the Boston Group outing held last summer and also some interesting scenes taken in Panama and Jamaica.

Canadian Rubber Sections

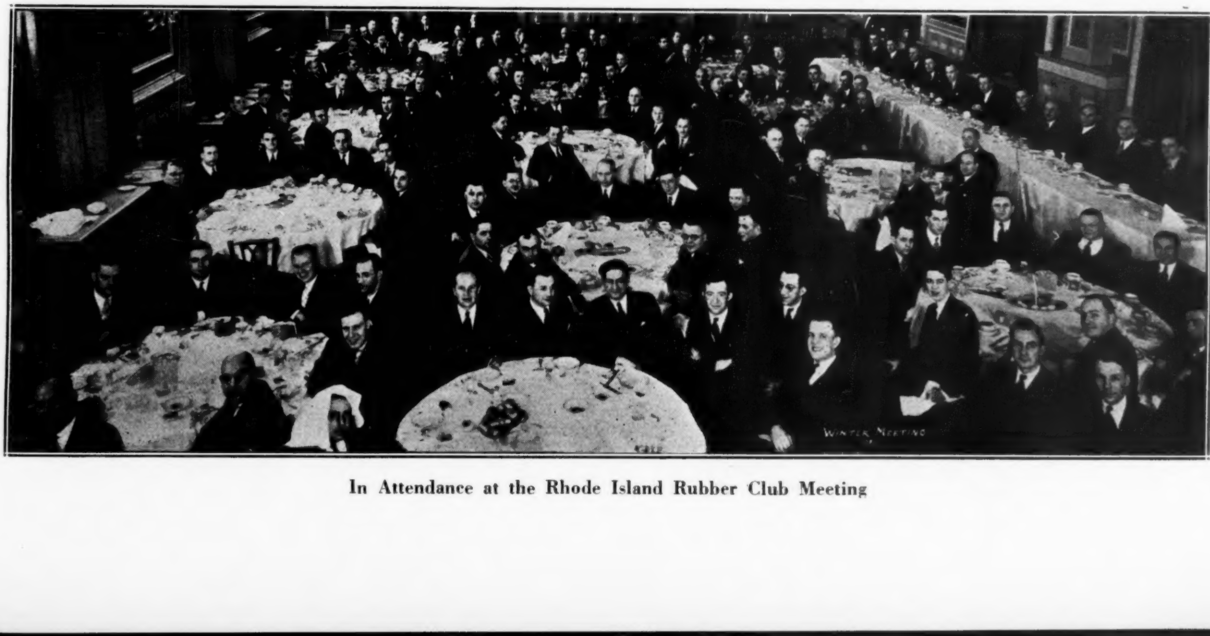
A JOINT meeting of the Rubber Sections of the Toronto and Hamilton Chemical Associations was held at the Hart House, University of Toronto, Toronto, Ont., Canada, on November 26. Prior to the technical meeting 63 persons had dinner, with an attendance of 105 at the meeting, at which G. R. Smye, of the Firestone Tire & Rubber Co., presided. Dr. S. M. Martin, Jr., of the Thiokol Corp., Yardville, N. J., gave a talk on " 'Thiokol' Synthetic Rubber," which was supplemented by several slides illustrating the different properties of "Thiokol" compounds. A large number of samples of processed material and finished products made from "Thiokol" were on exhibit.

According to Dr. Martin, there are four "Thiokol" synthetic rubbers in commercial use: "Thiokols" A, B, D, and DX. He discussed "Thiokol" DX Compounding in detail, particularly regarding three points: (1) the incorporation of a vulcanizing agent; (2) the selection of a suitable plasticizer, when necessary; and (3) the use of suitable reenforcing pigments. In his discussion Dr. Martin pointed out that zinc oxide is the appropriate vulcanizing agent and is used in amounts of between 5 and 10% on the "Thiokol" DX. Altax, when used in amounts of from 0.1 and 0.2% on the "Thiokol" DX, provides for sufficient softening for processing. The carbon blacks which are the best reenforcing pigments differ in their behavior in the stock. The type of black and the amount used are dependent upon the properties desired in the cured stock. Soft blacks can be used in higher amounts than channel blacks.

In addition to being highly resistant to oils and solvents, "Thiokol" DX stocks, when compounded with carbon black, are sun resistant. A stock made with a blend of 50 parts of "Thiokol" DX and 50 parts of rubber, which contains an antioxidant and a sun-proofing material, has been found to be non-checking in the sun. Curb pump hose covered with such a stock is now being tested.

Accelerator-Plasticizer

O-X-A-F, the zinc salt of mercapto benzothiazole, was recently developed for use as an accelerator and as a chemical plasticizer of uncured rubber. This product is manufactured by Naugatuck Chemical Division of United States Rubber Products, Inc., 1790 Broadway, New York, N. Y., which claims that it is non-discoloring, compatible with other accelerators, and adaptable to any type of compound and for any length of cure.



In Attendance at the Rhode Island Rubber Club Meeting

Exposition of Chemical Industries

THE developments of the last two years in the chemical industries were presented by more than 300 exhibitors at the sixteenth biennial Exposition of the Chemical Industries, held from December 6 to 11 at the Grand Central Palace, New York, N. Y. A wide variety of chemicals and equipment for the rubber industry was on display as well as a number of rubber products.

Under the sponsorship of the American Chemical Society an exhibit, known as "Children of Prosperity," comprised about 100 recent industrial chemical developments. Among these, seven were related to rubber: "RPA No. 2," rubber peptizing agent, "Cordura," rayon yarn for tires, "Ti-Cal," titanium-calcium pigment, and "Monastral Fast Blue BS," color pigment, all developed by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; and "Santomerse," melting agent, "El-Sixty," accelerator, and "Santoflex B," antioxidant, developments of the Monsanto Chemical Co., St. Louis, Mo.

Among the companies exhibiting materials of interest to the rubber industry were: The Sharples Solvents Co. (plasticizers), The Neville Co. (coal-tar resinous products and synthetic resins), Hercules Powder Co. (chlorinated rubber finishes), and Wishnick-Tumpeer, Inc. (carbon black, chemicals, and pigments). The latter showed interesting movies of the production of Witco carbon black.

Machinery, heavy equipment, and laboratory ware for use in the rubber industry were the subject of many exhibits. Among the equipment presented were ball and pebble mills, colloid mills, hydraulic presses, centrifuges, mixers, newly designed pH meters, attrition mills, rotary knife cutters, weather testing instruments, and materials handling equipment. A number of exhibitors displayed indicating, recording, and controlling instruments for process control.

Rubber manufacturers exhibiting at the show included the American Hard Rubber Co., Garlock Packing Co., Maurice A. Knight, and Luzerne Rubber Co. The Knight exhibit displayed unbreakable rubber drums for acids and a new rubber acid-resisting joint for bell and spigot piping. The hard rubber exhibits emphasized the wide diversity of applications for this material. The new filter cloths made of glass fibers utilize rubber as an edge binder. Another application of rubber on display was in a pipe conveyer system where the pipe line is made of rubber.

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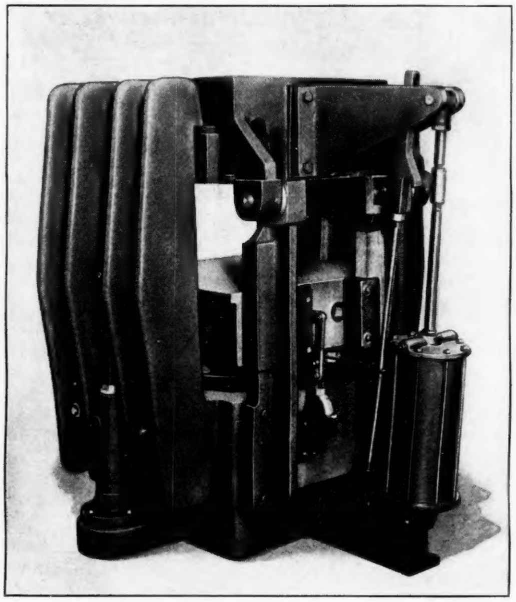
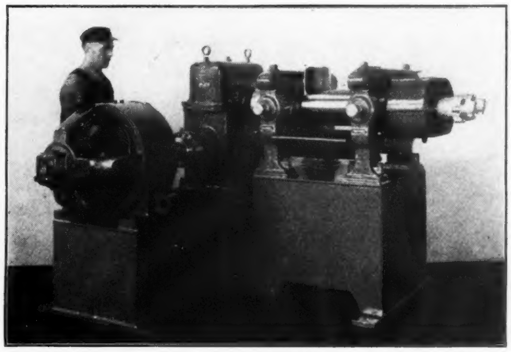
New Machines and Appliances



New Molding Press



Rubber and Plastics Mill

Tilting Head Press

A NEW heavy-duty hydraulic press, tilting head type, has been developed primarily to save time when filling the mold. Adaptable to ordinary hydraulic systems, this press operates in the same manner as a standard press with the exception of the tilting mechanism for operating the crosshead. The tilting head is operated on the downward stroke by releasing a safety catch and exhausting the pressure from the control cylinder which can utilize either hydraulic or air pressure. The tilting head control cylinder shown at the rear of the press is not worked in conjunction with the hydraulic pressure of the main ram, but is a separate mechanism. When the head is in the closing position, it is locked in place by vertical side members operated by cams on the lower ram head. Thereafter the operation is the same as for standard hydraulic platen presses.

This tilting head unit is built in all standard sizes up to and including 38-inch square platen. Presses are available with rams from 14 to 24 inches in diameter for operation on hydraulic pressures up to and including 2,500 pounds per square inch. National-Erie Corporation, Erie, Pa.

Improved Mill

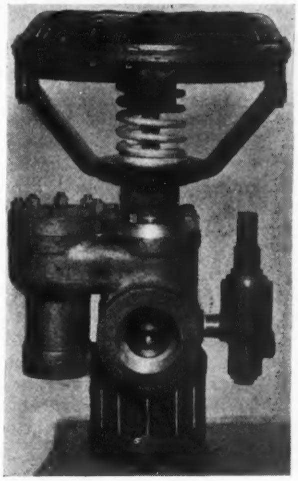
SEVERAL important features of design have been built into a small two-roll mill (8 by 14 inches) for processing rubber and plastic stocks which develop high heat. Departure from conventional practice comprises the use of anti-friction roller bearings for the roll journals, and direct drive of the rolls from the worm gear unit without the usual intermediate drive gear and pinion.

The mill is driven by a $^{10}/_{15}$ h. p. direct current motor, having a variable speed of from 400 to 1,200 r. p. m. Farrel Gearflex couplings connect the motor with the gear unit and the gear unit with the drive roll of the mill. Connecting gears are enclosed in a combination gear guard and oil pan. The rolls are fitted with joints especially adapted to high temperatures.

The entire assembly is mounted on a box section baseplate of welded steel which is machined for mounting the several units in arcuate alinement. Farrel-Birmingham Co., Inc., Ansonia, Conn.

Hydraulic Operating Valves

HYDRAULIC operating valves are built in one- and two-pressure designs, air operated by timer control or manual control. All two-pressure valves are tapped for an automatic high-pressure valve. With this arrangement used on a hydraulic press the high-pressure valve opens when a predetermined pressure is reached in the press cylinder after the closing of the press. The high-pressure valve also closes automatically when the drain side of the two-pressure is opened. Various combinations of movements can be attained through the use of timer control cams. To keep the high pressure from running through to the low-pressure line a check valve has been built into the main valve body.



Three-Inch Two-Pressure Hydraulic Valve

Through rugged construction and proper design, these valves are claimed to give satisfactory service over a long period. The seat rings and valve disks are made of wear and corrosion resisting alloys such as monel metal, stainless steel, and stellite. The seats do not become hammered out as the valve is so designed that the disk does not strike the seat rings sharply, but settles with a gradually increasing pressure. The Sinclair-Collins Valve Co., Akron, O.

New T-50 Test Unit

A COMPACT and portable apparatus for performing the T-50 test has been designed by Naugatuck Chemical Division of United States Rubber Products, Inc., in collaboration with the Henry L. Scott Co. This equipment is being manufactured by the Henry L. Scott Co. and is now available to the rubber trade through Naugatuck Chemical. The apparatus, which is self-contained in a compartment that

measures 26 by 18 by 10 inches, comprises essentially a cooling chamber, a circulating system, and a pan with provisions for immersing 16 samples in acetone. The samples are placed individually in removable, rod-like holders and fastened by means of thumbscrews, one end to the fixed clamp on the holder and the other end to the sliding clamp. The sample can be elongated for testing by sliding the clamp, which is then held by a tripping device. An adjustable marker for indicating the desired retraction can be positioned at the correct point on the rod. When adjusted, the holder with test sample is placed horizontally in a frame built into the acetone pan.

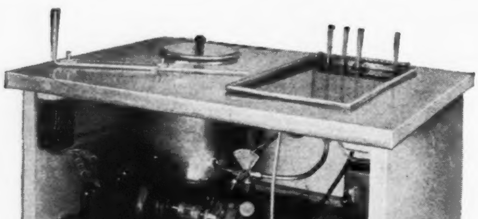
A rotary pump, driven by a 1/20 h. p. motor, circulates the acetone from the sample pan through a 30-foot coil housed in an insulated dry-ice container and back into the bottom of the sample pan, completing the cycle. Temperature in the sample pan is measured by a thermometer supported by an ordinary laboratory stand. At the end of the freezing period the samples are released from tension by depressing the tripping device on each holder. A 500-watt immersion heater, located in the bottom of the pan, is turned on, thus raising the acetone temperature during the thawing period. The cooling coil is cut out, and circulation in the pan is maintained by a by-pass arrangement.

Safety characteristics are provided by spark-proof motor and switches. The equipment avoids the use of a Dewar flask, which is somewhat hazardous because of the possibility of breakage. The circulatory system which maintains uniform mixing of the acetone during both freezing and thawing periods eliminates the use of a mechanical stirring device with its attendant waveformation.

Application and Description of Test

The T-50 test, described by Gibbons, Gerke, and Tingey,[1] is a simple and rapid method for measuring the state of cure of vulcanized rubber. The stretched rubber samples are immersed in cold acetone and frozen until practically no retraction occurs upon their release. The acetone is warmed, and when the samples have retracted to 50% of their initial elongation, the temperature of the bath is recorded in degrees Centigrade. This temperature is the T-50 value. The practical application of this test has been described in detail by Tuley.[2] Naugatuck Chemical Division of United States Rubber Products, Inc., 1790 Broadway, New York, N. Y.

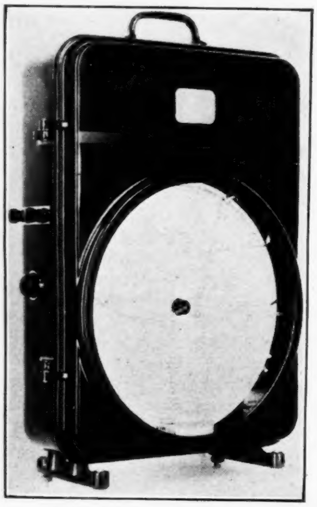
[1] *J.I.E.C.* (*Anal. Ed.*) 5, 279-83 (1933).
[2] INDIA RUBBER WORLD, Oct., 1937, pp. 39-42.



(*Left*)
T-50 Apparatus

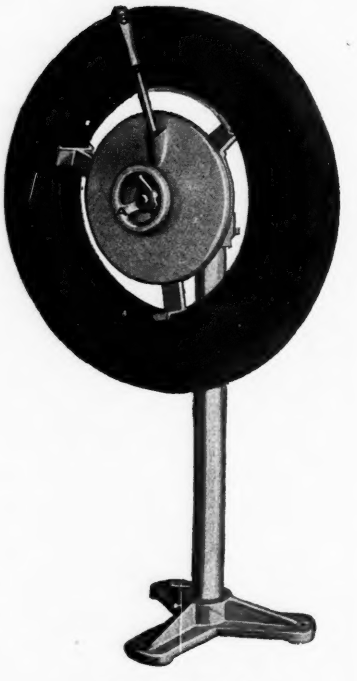
Portable Pyrometer

THE Portable Pyromaster, a new round-chart recording pyrometer, is compact and was designed for portable service. The instrument is rugged, is not affected by vibration, and does not require careful leveling while in use. There are no continuously moving parts or trains of gears. The instrument is composed of five separate replaceable units which have no mechanical connection with the galvanometer, the connection being electrical.



Portable Pyromaster

When an unbalanced condition in the potentiometer circuit occurs, a series of relay-actuated switches operates a motor to position the slidewire contact to which the pen arm is mechanically connected. The galvanometer is equipped with a highly damped coil; the arm is free to deflect at any time. These pyrometers are made for ranges from 0 to 500 and 0 to 3000° F., using standard thermocouples. The chart is 12 inches in diameter, and rotation is by telechron clock. The Bristol Co., Waterbury, Conn.

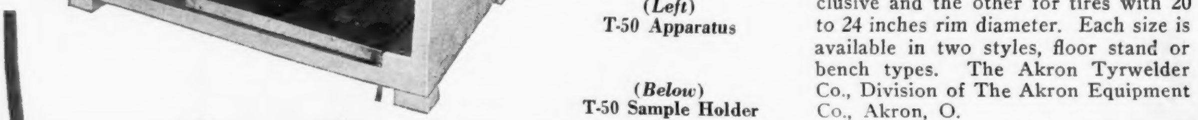


Tyrwelder Stand

Tire Building Stand

THE Tyrwelder tire building stand is a self-adjusting device for holding tires for the following purposes: inspection, cutting off old tread stock, cementing, and applying camel-back. A simple reversible ratchet enables the wheel to be locked against rotation in either direction, or to be rotated freely. Its operation is simple; in reference to the illustration, the locking wheel *A* is loosened, and while the right hand steadies the assembly, the left hand rotates the lever *B*, extending the three arms until they automatically center the tire on the stand. The arms are locked in this position with wheel *A*. While the stand is in use, lever *B* can be removed from its socket and dropped out of the way in an opening provided for it at the back of the stand. The stand is available in two sizes: one for tires with 15 to 21 inches rim diameter inclusive and the other for tires with 20 to 24 inches rim diameter. Each size is available in two styles, floor stand or bench types. The Akron Tyrwelder Co., Division of The Akron Equipment Co., Akron, O.

(*Below*)
T-50 Sample Holder



New Goods and Specialties

Seamold Bathing Suits

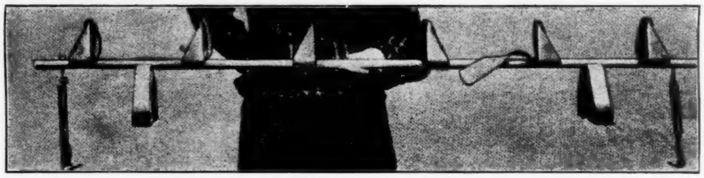
AMONG the smartest bathing suits of the new season are the creations of Artistic Foundations, Inc., which offers these Seamolds, as they are so aptly called, in three models: maillot in Satin Lastique and maillot panel in Lace Lastique and Silk Spun Lace Lastique. Lastique is the firm's trade name for its own special rubber thread, here used whereby both rayon and silk warps are placed over cotton and rubber filling to result in a form fitting suit.

The Satin Lastique model, recommended especially for junior-miss sizes, is a one-piece garment that comes in ivory, black, Ching blue, and aquamarine. The maillot panel suits, also in one piece, are similar in style except that they feature a narrow panel to cover the front of the trunks. These suits appear in the Lace Lastique design, a lacy floral pattern that presents an open work weave, and are lined down the front and back. Colors offered are black, royal, gold, and wine. The Lace Lastique has a cotton weave, and the Silk Spun, a silk finish.

Seamolds are made in sizes 32, 34, 36, 38, and 40. All suits have low backs with straps over the shoulders. All also are fashioned with a bra top in a draped cup-shaped style. Seamolds have a one-way stretch up and down in the back and give cross-wise at the sides. These attractive bathing suits have a wide and ready appeal and are sure to be seen at the leading beaches as the season grows.

Auto Ski Carrier

SKI-TOTE, a recently patented invention consisting of two light metal racks and rubber cushioning materials, provides a simple method for carrying skis on the tops of automobiles. Rubber covered hooks are used to attach the carrier to the rain gutters of the car. For protection of the car top, sponge rubber blocks are used under the metal supports. The most important use of rubber, however, is in the device for attaching the skis and poles to the carrier. For this purpose rubber bands are used which can be readily "de-iced" by a slight tug. In addition, these straps afford complete protection against scarring of the skis. This adequate use of rubber results in a carrier that is firm without being rigid and permits traveling at high speeds over jolting roads without danger to the skis. Colvin Ski-Tote Co.



Ski-Tote

Toe-Action Tread Tire

THE Daytonian Tire features a new type of tread, called "toe-action" because of the similarity of its action to that of an athlete's toes when running. This action, which is due to molded slots in the tread ribs, is claimed to provide for emergency stopping and noiseless traction without sacrifice of wearing qualities.

Dayton "Toe-Action" Tire

The cord body of this new tire makes use of a new type cord which, by a more compact arrangement of individual cotton fibers and special processing to prevent fiber displacement, is said to be resistant to heat producing stress and strain as well as tire growth. The contour of the new Daytonian has been designed to distribute flexing action on the finer textured cord body so as to produce an easy, shock-proof ride. The Dayton Rubber Mfg. Co.

Playing Croquet with Rubber Mallet and Rubber Ball

Rubber and Croquet

THE game of croquet once again is enjoying great popularity, and rubber is partly responsible for this revival of interest, for recently a large manufacturer of croquet sets conceived the idea of modernizing his product through the use of rubber. He submitted his problem to The B. F. Goodrich Co. and with the aid of its engineers developed a hard sponge rubber ball and a semi-hard rubber mallet head, both of which are said to be more uniform and true than wooden ball or mallet. It is further claimed that this new equipment speeds up the game of croquet and also calls for more skillful playing.

Rubber Dice Cups

DICE cups, made of a flexible and durable rubber compound, have the appearance of leather cups used for the same purpose. The top of each cup has a rim on the inside which acts as a baffle, preventing the dice from rolling out too rapidly. The inside is lined with cushion rubber and the botton is reenforced on the inside in order to withstand rough usage, Rohde-Spencer Co.

Rubber Used in Dry Cleaning Machine

THE National Rubber Machinery Co., Akron, O., is using rubber for mounting the mechanism and absorbing centrifugal forces in its new synthetic dry cleaning units. This new machine, known as the Imperial, eliminates intermediate handling and automatically completes the four essentials of operation: cleaning, balancing, extracting, and deodorizing in a period of only 15 minutes. The cleaning fluid is basically carbon tetrachloride and is non-inflammable. In spinning the basket of clothes at 1,000 r. p. m. a centrifugal out-of-balance as much as 4,000 pounds is absorbed by the rubber mountings, thus eliminating vibration from the machine unit.

Rubber Industry in America

OBITUARY


John H. Connor

John H. Connor

ON NOVEMBER 22 in Paris, France, died John H. Connor, senior vice president, a director, and manager of all foreign affairs of United Shoe Machinery Corp., 140 Federal St., Boston, Mass., with which he had been affiliated in an official capacity since its inception in 1899. His previous business connections were with Hazen B. Goodrich Co., shoe manufacturer, and Ellis & Connor.

He was born in Charlestown, Mass., November 15, 1854, and attended the local schools.

Mr. Connor was a thirty-second degree Mason, a member of Aleppo Shrine and other Massachusetts Masonic bodies and of the Algonquin, University, Brae Burn Country, and Abenaqui clubs.

The deceased leaves his wife, a son, a daughter, a granddaughter, a brother, and a sister.

Stanley Krall

STANLEY KRALL, manager of the Product Development Department of The Fisk Rubber Corp., Chicopee Falls, Mass., died November 22, 1937, after a brief illness. He was born in Detroit, Mich., but his family moved to Cleveland, O., when he was a few years old. He attended the public schools and the Case School of Applied Science, graduating in 1916 with a B.S. degree in chemistry.

Immediately after graduation, Mr. Krall was employed in the laboratories of the Firestone Tire & Rubber Co., remaining there until 1924, when he resigned to become chief chemist for the Mason Tire & Rubber Co., serving in that capacity for almost two years. Mr. Krall became associated with Fisk on December 1, 1925, advanced to manager of the Compound Division of the Product Development Department in April, 1927, and was made manager of the Product Development Department, February 1, 1936.

He was a member of and past chairman of the Rubber Division of the American Chemical Society. He had contributed articles on technical subjects dealing with the rubber industry. Mr. Krall was also active in the affairs of the American Society for Testing Materials, the Society of Automotive Engineers, and The Tire & Rim Association, Inc. He also belonged to Springfield Country and the Appalachian Mountain Clubs, Springfield Lodge of Masons, and the Fisk Craftsman's Club.


Stanley Krall

Funeral services were held in Springfield, Mass., November 26, 1937.

Mr. Krall is survived by his mother, a sister, two brothers, his widow, a daughter, and two sons.

Victor C. Carr

VICTOR C. CARR, member of the advertising department of The B. F. Goodrich Co., Akron, O., died suddenly on December 1. Death was caused by heart disease. He joined Goodrich as a member of the sales promotion department in the Boston district offices in April, 1926, and was made Boston district advertising manager the following September. He remained in that post until April, 1934, when he was transferred to the Akron offices.

Born in West Roxbury, Mass., January 28, 1903, Mr. Carr was graduated *cum laude* from Boston College in 1925.

Besides his parents he leaves his widow, three children, one brother, and a sister.

Funeral services and burial were in West Roxbury.

John A. Lambert

JOHN A. LAMBERT, one of the deans of the rubber industry in America, died in St. Francis Hospital, Trenton, N. J., December 12 of pneumonia. He would have been 76 on January 19. Despite failing health, Mr. Lambert continued active management of the Acme Rubber Mfg. Co., Trenton, of which he was vice president, general manager, and treasurer. Coming to Trenton from Chicago in 1902, where he had been engaged in the rubber business, Mr. Lambert, together with the late George R. Cook, founded the Acme company, at first known as the Eureka Rubber Mfg. Co.

Receiving his education in his native Ireland, Mr. Lambert was graduated from St. Jarlath's College, Tuam, County Galaway, and taught school before coming to America.

Mr. Lambert was a prominent member and benefactor of the Blessed Sacrament parish at Trenton. He also belonged to the St. Vincent de Paul


Blank & Stoller, Inc.
John A. Lambert

Society and while in Chicago was made a life member of Phil Sheridan Council, Knights of Columbus. He was a member of the Trenton Country Club and for many years was active in outdoor sports. He belonged to the Trenton Club and was on the board of directors of the Rubber Association of America for many years and one of the organizers and president for several years of the Rubber Manufacturers' Association of New Jersey. He had been head of the Trenton Chamber of Commerce in the post-war period.

A requiem mass was said December 15 at the Roman Catholic Church of The Blessed Sacrament. Burial was in St. Mary's Cemetery, Trenton.

Four daughters, three sons, and two sisters survive.

B. G. Hamill

BARKER GUMMERE HAMILL, formerly a sales representative of the Murray Rubber Co., Trenton, N. J., which he left about 10 years ago, died in New York Hospital on December 13. Mr. Hamill was born in Trenton 57 years ago and was educated at Lawrenceville and Princeton. After graduating in 1902, be became secretary and treasurer of the Trenton Trust & Safe Deposit Co., of which his father was president. Later he became connected with the Murray Rubber Co. He is survived by his wife, two daughters, and a son. Burial was in Lawrenceville, N. J.

Wm. B. Foster

WILLIAM BYRON FOSTER, 63, advisory director of the E. I. du Pont de Nemours & Co., Inc., service department, Wilmington, Del., died December 21 from a heart attack. He had first worked for the Pusey & Jones Corp., but in 1902 joined du Pont as a draftsman. He became chief draftsman in 1904, assistant chief engineer in 1916, director of the service department in 1921, and advisory director in 1934.

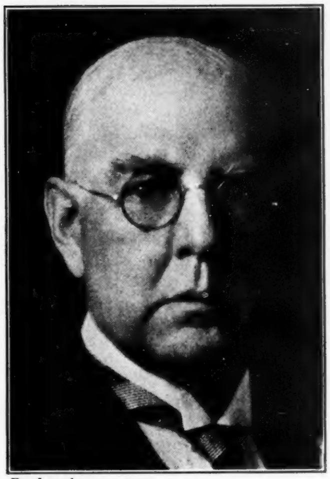
Mr. Foster was very prominent in Y. M. C. A. and Methodist Episcopal affairs in Wilmington.

He leaves his wife, two daughters, and a sister.

Frederick A. Hodgman

FREDERICK AUGUSTUS HODGMAN, retired executive of the Hodgman Rubber Co., which his grandfather founded a century ago, died suddenly on December 15 at his home in Tuckahoe, N. Y. He had joined the company after finishing school and was vice president in charge of manufacturing operations when the firm closed in 1925.

The deceased was born in Tuckahoe, January 28, 1870, and attended Bronxville School, Bronxville, N. Y., and Halsey School, New York, N. Y. During his lifetime he belonged to the New York Athletic Club and several country clubs. After his retirement he spent considerable time in his own machine shop in his residence, where he did choice cabinet work as a hobby.



Bachrach

Frederick A. Hodgman

Funeral services were held at his home December 18. Interment was private.

Mr. Hodgman leaves his mother, his wife, a son, two daughters, and a sister.

Miss M. M. Dunphy

MISS MARTHA M. DUNPHY, secretary-treasurer of The C. P. Hall Co., chemical manufacturer, Akron, O., died on November 25 after a brief illness. A native of Cleveland, O., she attended St. Vincent's School, Sacred Heart Academy, and a college of music.

Miss Dunphy was active and held office in both the Catholic Daughters of America and the Ladies Catholic Benevolent Association and also belonged to the Altar Society of St. Vincent's Church, Akron.

Blank & Stoller

Miss Martha Dunphy

Surviving are her mother, a brother, and two sisters. A requiem mass was said on November 29, and burial was in St. Vincent's Cemetery.

Manley E. Chester

A HEART attack caused the death, on November 16, of Manley Earle Chester, long an executive with The Whitney Blake Co., manufacturer of rubber insulated wire largely for telephone and telegraph use, New Haven, Conn. He was one of the incorporators of the company, which was started in 1912, and from then until 1919 served as secretary and a director. Mr. Chester next became general manager of the plant, which position he retained until his retirement in 1932. From 1897-1910 he was a telephone engineer with Western Electric Co.

The deceased was born in Champaign, Ill., January 29, 1876. In 1897 he was graduated from the University of Illinois after having majored in electrical engineering.

Mr. Chester belonged to the Quinnipiack, Graduates, Lawn, Madison Country, and Rotary clubs, New Haven and Hamden, Conn., chambers of commerce, New Haven Colony Historical Society, Neighborhood House Council, and Children's Center and was president of the Collector's Club and Hamden Historical Society as well as trustee of the Connecticut Savings Bank.

Surviving are his wife, three children, and three sisters.

J. H. Michelin

NEWS reached us of the death on December 2, 1937, of Jules Hauvette Michelin, 57, vice president and general manager of the Michelin Tire Co., at his home in Chamalières, France. Mr. Michelin was a nephew of Edouard Michelin and the late André Michelin, who are credited in France with having invented the demountable pneumatic bicycle tire and the pneumatic tire for automobiles. The Michelin company, with large plants in France and Italy, also for 23 years had a tire plant in the United States, at Milltown, N. J., operated by the late Jules Michelin, who lived in New Brunswick at the time. The Milltown works, which employed 1,800 persons and was considered a model of its kind, had to be closed in 1930 on account of unfavorable business conditions, and Mr. Michelin returned to France. He revisited the United States in 1932 to demonstrate his pneumatic-tired railroad car, having for many years been interested in solving the problem of this type of transportation and generally recognized as one of the original experimenters in this direction. He also was among the first to favor replacement of cord tires by balloon tires.

Surviving Mr. Michelin are his wife, a daughter, a son, and a brother.

EASTERN AND SOUTHERN

PLANT schedules remain steady under the present recession conditions with few changes reported. Employment is lagging; while relief rolls over the nation are gaining.

One authentic source declares the present decline in business is primarily an inventory recession although there have been other less important contributing influences including labor trouble, the decline in stock prices, fear of adverse developments arising out of the Oriental and Mediterranean situations, and increasing misgivings regarding government interference with private enterprise. It is common practice for business to accumulate excessive inventories in anticipation of higher prices, and it is not unusual, following such junctures, for periods of expanding economic activity to be temporarily checked. In view of past experiences with operations at high levels despite declining orders and declining prices business began reducing inventories by cutting production schedules. Now factory operations are running well below sales; consequently a period is being approached where it will become necessary to replace depleted inventories, at which point the recovery of business that started in the Summer of 1932 should be resumed.

This optimistic outlook for better business by the Spring of 1938 is shared by many industrial leaders, who believe that despite the recession beginning in October conditions in most industries in 1937 were eminently satisfactory, for the large volume of business that prevailed the greater part of the year more than offset the autumn decline and in some fields production exceeded that of any year since the peak of 1929.

Gerard Swope, president, General Electric Co., undoubtedly expresses the opinion of many business men in his outlook for 1938, as follows:

"Basic conditions are sound. The farmers have had bountiful crops, at good prices, and there is plenty of food for all our people. The cotton crop has been good and, although prices are low, with the improvement in methods the profit to the grower is greater. Oil is flowing freely. The main disturbance to our economic order is due to lack of confidence on the part of business and lack of faith in the future, part of which is undoubtedly due to the restrictive taxation on business and private enterprise. There seems a distinct hope that there will be a revision in the tax on undistributed earnings, which will tend to help the smaller business man particularly, and also a revision in the tax on capital gains, which now interfere with the natural economic flow.

"If a satisfactory solution is reached and the country is placed on a basis of limiting its expenditures to its income, with the absence of retaliation or reprisal on the part of either business or government, and indeed with a constructive effort and cooperation on the part of both, there is no reason why American business should not resume the function it has played so well in the past, through the mechanization of industry, of making possible the enjoyment of more goods for more people at less cost."

U. S. Rubber Notes

F. B. Davis, Jr., Gives "A Basis for Employe Relations"

In an address at the Congress of American Industry of the National Association of Manufacturers, Waldorf-Astoria Hotel, New York, N. Y., December 9, F. B. Davis, Jr., president of the United States Rubber Co., 1790 Broadway, New York, N. Y., enumerated a number of principles which should be used as a basis for employe relations.

"Those of us in our organization," he said, "who have employe relations as a responsibility, are in pretty thorough agreement on a basic point. We feel that there is no such thing as human happiness without self-respect.

"It is true that self-respect is achieved in different ways by different individuals. Some attain it through demonstration of ability to make material success. There are others who find it in the sense of having mastered an art, a craft, or a technique of some other kind. . . .

"All men want to feel that they amount to something . . . have something to be proud of. . . . This is a cardinal point upon which our policy of employe relations rests. We try to remember that every employe is a human being subject to this feeling about himself, and we believe that we can expect no contentment among our workers unless we strive to maintain their self-respect.

"It is in little things, perhaps, that this policy expresses itself. For example, a mere "yes" or "no," although it may be the final answer, is not nearly so effective as an adequate explanation as to why it is necessary to give such an answer. The very fact that a man is given an explanation implies, first, that he is entitled to one; second, that he is a sensible, reasonable individual to whom it is worthwhile to submit reasoning.

"It is my sincere belief that success in the employe relations of industry depends upon foremen who are men of integrity, character, and fair dealing, coupled with a sympathetic understanding of human nature, and its wants, its needs, its limitations . . . and are not, on the contrary, inclined to be arbitrary, autocratic, abusive or unfair.

"Contact with employes cannot, of necessity, be as frequent and intimate as might be wished. But, in order to promote harmonious relationships within our industries, we must at all times seek out every opportunity to make contact with our employes, and to operate on the basis of sound logic, rather than on emotional impulses.

"What we need and are seeking is confidence . . . mutual confidence . . . confidence of the employe in management, and confidence of the management in its employes. This confidence is obtained only through the actual application of fair dealing and consideration . . . the development of direct employe contacts which will produce the result for which we are all striving —cooperation.

"I, for one, have confidence in the sound thinking of the American industrial worker when he has the facts before him, as I also have in that of American Industry."

Branch Changes

United States Rubber Products, Inc., 1790 Broadway, recently moved its Pittsburgh, Pa., branch from 601 E. General Robinson St. to the nine-story and basement warehouse at Isabella and Sandusky Sts., Northside, to be used as district sales office and warehouse.

The company, in order to handle increasing business, also moved its Omaha, Neb., branch to larger quarters at 13th St. and Capitol Ave., where it has leased nearly 100,000 square feet of space. E. J. Milota is district manager of footwear and clothing sales for the firm; F. J. Shick is manager of mechanical goods, and John Griffin, tires.

Address on Rubber Springs

Walter G. Keys, of the Mechanical Goods Division, U. S. Rubber Products, was the speaker at the last meeting of the Providence, R. I., Engineering Society. His subject was "Rubber Springs, Design Calculations and Representative Uses." Mr. Keyes, who is stationed at Detroit, has made practical application of rubber springs for railway cars, a wide variety of types of machinery and vehicles, insulation against vibration set up by drop hammers, and the protection of radios from destructive vibration. He used lantern slides in the illustration of his talk.

Webster Norris, who retired early last year as associate editor of INDIA RUBBER WORLD, leaves on January 4 for his annual winter sojourn in Florida. He will be gone three months. The address is P.O. Box 97, Orlando, Fla.

Kaysam Corp. of America has announced the removal of its New York, N. Y., offices from One E. 57th St. to 41 E. 57th St.

ASA Meeting

American Standards Association, 29 W. 39th St., New York, N. Y., on December 1, held its annual meeting at the Hotel Astor, New York. President Dana D. Barnum announced 16 new national groups have affiliated within the past year.

The 59 standards added in 1937 bring the number of American standards to 382, approved since the association was organized in 1918 to act as a clearing house for the many standardization activities of trade associations, technical societies, and government bureaus in this country.

In the electrical field the Elevator Safety Code was revised, incorporating many new provisions for safe practices in elevator design and operation, the result of research conducted at the National Bureau of Standards.

Among the important revisions completed last year are the National Electrical Code and the American Standard for Compiling Industrial Injury Rates. This last provides a method of comparing accident statistics of departments, jobs, and workers. The same committee that developed this is working on a standard practice for collecting accident causes, soon to be published for trial use.

The Safety Code for Power Presses, one of the first and most important standards in the field of industrial safety, was also revised.

In connection with its international work, the ASA was invited to fill a vacancy on the Council of the International Standards Association; and at the board meeting on December 1, P. G. Agnew, secretary, American Standards Association, was appointed the official ASA representative.

At the annual meeting election of officers for 1938 occurred with the following results: president, Mr. Barnum (reelected); vice president, Edmund A. Prentis (reelected); chairman, Standards Council, F. M. Farmer (reelected), vice chairman, R. P. Anderson.

Ralph K. Guinzburg, president of the I. B. Kleinert Rubber Co., 485 Fifth Ave., New York, N. Y., was honored at a testimonial dinner on December 1 by about 350 leaders in the notion and novelty and allied industries in recognition of his business, civic, and charitable activities. Mr. Guinzburg, an organizer of the Notions Association, was its president for two years. He is 1937 chairman of the notions and novelty division of the New York-Brooklyn Federation campaign for $6,250,000 to aid the needy of New York.

William M. Morse, Editor Emeritus of INDIA RUBBER WORLD, as usual since his retirement, is wintering in Florida and has taken a bungalow for the season in Clearwater on the corner of Sunset Dr. and Marshall Ave. As his hobby is fishing, he makes frequent trips on the Gulf of Mexico and reports very good catches.

Bill Higgins

Regrets from Bill Higgins

For the first time in many years Bill Higgins, of United Carbon Co., 350 Fifth Ave., New York, N. Y., was unable to attend the annual Christmas meeting of the New York Group, Rubber Division, A.C.S., on December 17. While on a business trip to Chicago late in November, he was unfortunate in breaking his leg and has been confined to his home since that time. However he is progressing nicely and expects soon to be carrying on his usual activities in connection with the rubber trade.

Objections to Lower Footwear Tariffs

Representations have been made to the trade agreements section of the State Department at Washington by some Congressmen that domestic producers of rubber-soled footwear will be penalized if the tariff is lowered under the pending trade agreement with Czechoslovakia. It is pointed out that the policy of the government of granting concessions to all countries on products on which it has already conceded to one particular nation is particularly harmful. While at the present time Czechoslovakia may not be an important factor, other countries such as Japan manufacture rubber footwear at such a low cost that lowering of the tariff would prove a hazard to the industry within the United States.

Advance import statistics from the Bureau of Foreign and Domestic Commerce show that in October Japan exported to the United States 52,622 pairs of rubber-soled footwear, while only 1,094 pairs were received from Czechoslovakia and 1,500 pairs came from Austria.

Dr. George Kratz, New York representative of the Vultex Chemical Co., 666 Main St., Cambridge, Mass., has returned to his duties after having recovered from an appendicitis operation.

G-E News

General Electric Co., Schenectady, N. Y., recently opened a new molding plant for its Plastics Department at One Plastics Ave., Pittsfield, Mass., which is entirely devoted to the research, development, design, and manufacture of molded plastics products. The plant has about 900 employes including 36 trained engineers and chemists and boasts 324 presses, the largest number operated by any single molder in the country. G-E, which started manufacturing plastics parts for use in its own products more than two score years ago, but now offers Textolite plastics service to industry in general, has additional plants at Lynn, Mass., Meriden, Conn., and Fort Wayne, Ind. Sales offices with Plastics Department Specialties are located in Chicago, New York, Cleveland, Detroit, Lynn, Meriden, and Pittsfield.

Profit Sharing Disbursements

In accordance with the General Profit Sharing Plan authorized by G-E stockholders in April, 1934, a semi-annual payment of approximately $3,700,000 was paid to employes the middle of last month, Gerard Swope, president of the company, announced. The profit sharing distribution to employes is on the same basis as the estimated profits as made for the stockholders. Further, in 1938 there will be paid out of the 1937 profits of the company 2% additional on the G.E. Employes Securities Corp. 5% bonds, which will amount to about $500,000. For the last half of 1936 the amount paid to employes under the profit sharing plan was $2,191,000.

New Appointments

President Swope also announced that Charles E. Wilson, since 1930 vice president in charge of the appliance and merchandise department of the company, which he joined in 1917, on December 15 was elected executive vice president, a new position. His headquarters will be at the G-E main office in New York, N. Y., at 570 Lexington Ave.

At the same time Philip D. Reed was elected assistant to the president. Mr. Reed, who will also be at the main New York address, has been with the company since 1926 and since 1934 was general counsel of the lamp department.

Nathan R. Birge, with G-E since 1900 and assistant to President Swope since 1927, last month was elected a vice president of the General Electric Co.

Foster Dee Snell, president of Foster D. Snell, Inc., firm of consulting chemists and engineers, 305 Washington St., Brooklyn, N. Y., on December 2 addressed the New York Section of the American Society for Testing Materials on "Some Factors in Detergency."

(Continued on page 88)

OHIO

BUSINESS seems about the same in Ohio. Steel operations are the lowest since 1934, and one company abandoned 23 shut mills because of obsolescence, resulting in the dismissal of 1,500 employes. Scattered reports from the rubber industry, however, indicate a more promising outlook; and machinery makers find business improving. November, generally a good month for tires and tubes, proved no exception in 1937; sales gained materially the second half of the month and thus left stocks about normal.

New Rubber Factory

The Lower Rubber Mfg. Co., recently organized in Ravenna, will start production in mid-January, according to President M. S. Lower. Construction of the building has been completed, and nearly all the machinery is in place, making one of the most modern and efficient plants of its kind and costing about $50,000. Work on the factory began late in September.

At first the firm will make household articles, toys, and hydrometer fittings, but officials are investigating several other fields with a view to increased variety in production.

About 15 employes will be on the original payroll, but the company hopes to increase this number to 40 or 50 by June. Capacity production of the present plant could be handled with 75 employes, working in three shifts.

Other company officers are vice president, E. J. Smith; secretary-treasurer, H. S. Baughman; and other members of the board of directors, L. L. Baldwin and A. V. Dix.

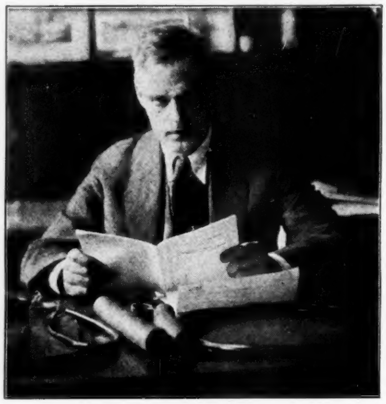
Republic Rubber Division, Lee Rubber & Tire Corp., Youngstown, closing one of the most successful years in its history, held its sales conference October 26-29. Under the direction of O. S. Dollison, vice president in charge of sales, the conference covered a wide range of topics treating of the manufacture and distribution of Republic products. New goods were introduced, and recent developments explained. Sales and the sales promotional program for the coming year were dealt with in separate meetings under the leadership of H. P. Schultz, sales manager, E. M. Skirt, assistant treasurer, H. W. Croysdale, vice president and factory manager, C. H. Zieme, service engineer, and A. Brill, development manager.

Among Those Present at the Sales Conference of Republic Rubber Division

The Wilson Rubber Co., manufacturer of all kinds of rubber gloves, 1200 Garfield Ave., S. W., Canton, on November 15 reopened, after a suspension of operations for three years, its Plant No. 2 at 1117 Marion Ave., S. W., with an added capacity for the company of 12,000 pairs of gloves daily. The firm's increased business could no longer be handled at the Garfield Ave. factory. The past several months were devoted to the installation of extensive new equipment at the reopened plant, together with installation of air conditioning in the dipping rooms, at an approximate expenditure of $15,000. Fred J. Wilson is president and general manager of the company; Wendell Herbruck, vice president and secretary; and Karl P. Herbruck, treasurer and assistant general manager. The firm maintains sales offices at 15 Park Row, New York, N. Y., 230 W. Huron St., Chicago, Ill., and 530 Howard St., San Francisco, Calif.

National Rubber Machinery Co. Takes Over Chernack Loom

As the result of recent arrangements with the Anaconda Wire & Cable Co. the nationally used loom weaving machines, known as the Chernack Looms, will hereafter be manufactured and sold by the National Rubber Machinery Co., with general offices at Akron. These looms, manufactured in three sizes, 64, 120, and 336 heddle type, are familiar to the manufacturers of rubber hose and insulated wire as dependable high-speed machines, compact and flexible for adaptation to various products.



Joseph A. Kennedy

Joseph A. Kennedy, acting as sales agent for these looms, comes to the National Rubber Machinery Co. with 30 years' association with the wire industry. He has spent many years designing, patenting, and selling machines for producing tubular woven fabrics for use in the electric, automotive, and hose industries. Mr. Kennedy was a design engineer as well as factory manager for the Tubular Woven Fabric Co., Pawtucket, R. I., which was later acquired by the Anaconda Wire & Cable Co. At the time of the consolidation with Anaconda he was placed in charge of development and promotion of the Chernack Looms and has continued in that capacity for a number of years.

Goodrich Activities

Industry on Sound Basis

Industry is set to go ahead with any general business upswing says S. B. Robertson, president of The B. F. Goodrich Co., Akron, when pointing out a number of factors in the present condition of the rubber industry. With tire shipments substantially the same as in 1936, an increased demand for other rubber products caused sales volume in the rubber industry to be the best in 1937 for any year since 1929. Preliminary estimates indicate that shipments of pneumatic casings in 1937 approximated 53,500,000 units, against 54,022,000 in 1936. However it is probably true that consumer purchases of tires increased during 1937 and that the dealer stocks were reduced sufficiently to offset the decline in tire manufacturers' shipments. Given improved business conditions generally next year, the replacement business should show an increase.

Improvement of manufacturing and shipping facilities, together with expansion of its research efforts, finds

the rubber industry in position today to take advantage of any upswing in business in 1938.

The tendency toward stabilization of the rubber industry, especially as to its price structure may be in part credited to the ever-widening market for rubber, which has lessened the dependence of manufacturers on the tire business. Whereas tire sales accounted for 68% of the industry's dollar volume in 1927, they accounted for only about 58% in 1937.

A recent cross-section survey of American industry by *Product Engineering* shows that 139 out of 506 companies manufacturing machinery, transportation equipment, instruments and appliances use rubber in one form or another.

The fortunes of companies manufacturing American rubber products are closely linked to the world price of crude rubber. The recent action of the International Rubber Regulation Committee to reduce shipments to 70% of basic quotas had a stabilizing effect on the price of crude. Stability in price is essential to the expansion of the rubber industry for only with such stability at a fair price can the uses for rubber be broadened by rubber manufacturers.

With rubber costs representing only about 18% of the average list price of the tire, and an increase in other cost factors, notably labor, selling costs and especially taxes, tire prices today do not reflect a normal profit in relation to costs or to the present price of rubber. In view of this fact a reduction in tire prices in the near future is not anticipated even though declines have taken place in the commodity prices of both rubber and cotton, the two basic tire ingredients.

After enumerating many of the new uses for rubber, Mr. Robertson further states, "Thanks to its continued efforts to get its own house in order, with any improvement in general business conditions in 1938, the rubber industry will be in an excellent position to do its part toward the establishment of genuine prosperity."

New Director

A. B. Jones, chairman of the New York City Tunnel Authority, on December 21 was elected a director of the Goodrich company, of which he was formerly first vice president, to serve the unexpired term of C. B. Raymond, resigned. Mr. Jones first entered the rubber business as superintendent of the South Akron plant of the Diamond Rubber Co., in 1908. When the Goodrich and the Diamond companies consolidated in 1912, he became assistant works manager, then second vice president, and four years later first vice president of Goodrich.

Factory Notes

A list of awards totaling $1,620 for suggestions pertaining to better methods in factory operations, new devices, etc., and providing extra Christmas money for many employes, was announced last month by the Goodrich Suggestion Committee.

Sixty-one names comprise the list of those reaching ten years of service at Goodrich in December and thus are entitled to join divisional ten-year service clubs.

Silver Fleet in Florida

Goodrich's Silver Fleet, engaged throughout the year in testing tires, recently arrived in Florida, where it will carry out its testing operations during the winter. Headquarters are in Orlando. In charge of Supervisor H. B. Viers, drivers of the Silver Fleet pilot their cars and trucks over 2,000,000 miles of highway each year.

New Diesel Battery Line

Goodrich recently announced a complete line of specially constructed batteries for Diesel starting service, including four six-volt types, two eight-volt types, and ten twelve-volt types. Eight of the batteries are of conventional construction, and eight are built with the Kathanode construction. With the latter flexible spun glass Kathanode retainer mats are used on both sides of the positive plates, holding the active materials adjacent to them for a longer period and thus increasing battery life.

These new Diesel batteries, according to the manufacturer, are built with thinner plates than heavy-duty types. All batteries, except the eight-volt models, are assembled in hard rubber cases. The eight-volt come in hard rubber jars and wood cases. Connectors are of solid lead, except the eight-volt types, which are of flexible copper with lead coating to prevent corrosion. Cell covers are made of reenforced hard rubber; terminal posts are of the braced type, with rubber gasket seals and locknuts to prevent acid seepage, allowing for vibration of plates without causing damage.

Goodrich Joins in Safety Plea

Taking part in a round-table discussion of traffic problems, during which the question of safety was attacked from the scientific, legal, and human-nature angles, David M. Goodrich, chairman of the board of the Goodrich company, stressed a new approach involving the human factor. The discussion was broadcast over a coast-to-coast hookup of the Columbia Broadcasting System and was one of a series conducted by the Benevolent and Protective Order of Elks.

"The Golden Rule should guide us on the road to safety," Mr. Goodrich said. "We, as pedestrians or motorists, should perhaps think less about insisting upon our rights and more about giving the other fellow room on the highways."

Mr. Goodrich said that he was confident that the two definite objectives of the safety program discussed—the reduction of at least one traffic hazard in each town and the elimination of the ticket-fixing evil—would do much to cut down driving accidents.

Master Tire Corp. Moves

General headquarters and general sales offices of the Master Tire & Rubber Corp. recently were moved from Akron to Findlay, where all business of the corporation will be directed from the general offices established at the plant of The Cooper Corp., an affiliate organization.

The Master Tire directorate also held its annual election of company officers, with the following results: president, John F. Schaefer; vice president and secretary, C. E. Hart; vice president in charge of production, W. B. Brewer; and treasurer, G. W. Lishawa. Elected to the board of directors were the following: the company officers, W. A. Hollington, P. W. Ewing, I. J. Cooper, Trimble McCullough, and Walter Davenport. Later E. D. Marvin was named assistant secretary and assistant treasurer.

R. P. Bremer, former Master president, F. C. Millhoff, vice president, and W. P. Cline, treasurer, had resigned their respective offices and are reported to be devoting their time to the Quaker City Rubber Co., Philadelphia, Pa.

Mr. Schaefer was one of the organizers of the Giant Tire & Rubber Co.,

Drucker-Hilbert Co., Inc.

Broadcasting for Safety: (*Left to Right*) Major Charles Spencer Hart, Grand Exalted Ruler of the Elks; Paul G. Hoffman, president, Automotive Safety Foundation; and David M. Goodrich, Chairman of the Board, The B. F. Goodrich Co.

a Master Tire subsidiary, secretary and then vice president of The Cooper Corp., and later secretary of Master Tire. Mr. Hart was president of Giant Tire since its formation in 1916. Mr. Brewer was superintendent of The Cooper Corp.

The new president said the company expects to carry on with a vigorous sales program, with tires and tubes, and will also add other lines to its manufactured items from time to time. The Cooper plant has the capacity to take care of an increased output. Mr. Schaefer further stated reports for 1937 for the company had been good.

Goodyear News

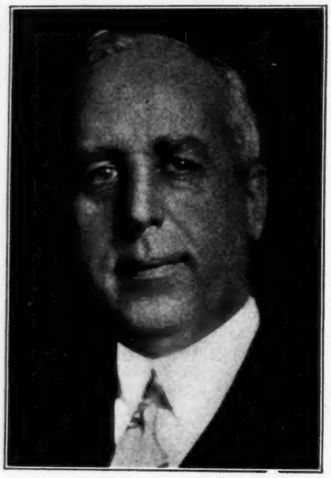
Company President

The Goodyear Tire & Rubber Co., Akron, a leading rubber manufacturing organization, owes much of its advancement to President Paul Weeks Litchfield. He joined the company as factory superintendent in July, 1900, after its first birthday, and directed construction of the first Goodyear automobile tire. Mr. Litchfield became a director in 1906, factory manager in 1911, vice president in 1915, first vice president in 1923, and president in 1926. He is also president of the Goodyear Zeppelin Corp., Goodyear Tire & Rubber Co. of California, Goodyear Tire & Rubber Co. of Alabama, Goodyear Tire & Rubber Co. of Argentine, Goodyear Fabric Corp., and Southwest Cotton Co. (Arizona), as well as chairman of the board of the Akron and California concerns, of Goodyear Tyre & Rubber Co. (Great Britain), Ltd., Goodyear Tyre & Rubber Co. (of Australia), Ltd., Goodyear Tire & Rubber Co., Ltd., of Canada, and other subsidiaries.

Under Mr. Litchfield's direction Goodyear has been one of the leaders in applying scientific principles and research to rubber manufacture. He abolished secret formulas and rule-of-thumb methods of compounding and manufacture by establishing a research and development department from which have come many improvements in the tire industry, as the straight side tire, cord tire, pneumatic truck tire, and Supertwist fabric.

Under his management Goodyear has grown to include 11 tire factories, five in foreign lands; six tire fabric mills in the United States and one in Canada; 40,000-acre cotton raising ranch in Arizona; and rubber plantations in Sumatra, the Philippines, and Panama.

Moreover he established an unusual program of industrial education with complete facilities so that every employe has a chance to learn. Goodyear Hall, housing Goodyear Industrial University, was dedicated in 1920. In the early days of the century when employe participation in factory management was rare, Mr. Litchfield developed the idea at his plant and sponsored the employe Council of Industrial Relations and the Goodyear Industrial Assembly. At a banquet tendered him celebrating his fifteenth anniversary with Goodyear he gave $100,000 as a welfare fund for factory workers.



Paul W. Litchfield

Mr. Litchfield is also widely known for his deep interest, dating back to 1908, and continuous activity in aeronautics, particularly in lighter-than-air craft. In 1911 under his supervision the company started designing army and navy training balloons for the government. During the World War, Goodyear built about a thousand free and observation balloons and a hundred airships for Uncle Sam. Through Mr. Litchfield's efforts in 1924 Goodyear Zeppelin Corp. acquired the German Zeppelin patents for building this type of rigid airship in the United States; later the company won the U. S. Navy award for the design of two 6,500,000-cubic-foot rigid airships, and the construction contracts in 1928. Goodyear then erected the world's largest airship dock where it built the two ships. In 1932 Mr. Litchfield received the American Society of Mechanical Engineers' second award of the Spirit of St. Louis medal for his service in advancing aircraft construction and design in America.

His birthplace is Boston, Mass.; the date, July 26, 1875. He attended public school and English High. Upon graduating in 1892 he was matriculated at Massachusetts Institute of Technology. Four years later a young chemical engineer with a B.S. degree, he secured his first job, surveyor for the Metropolitan Park Commission in Boston. After six months Paul Litchfield made his earliest contact with the rubber industry when hired by L. C. Chase & Co., Boston, manufacturer of tires and carriage cloth. From 1897 to 1898 he was employed by the International Automobile Tire Co. (later Michelin Tire Co.), Milltown, N. J. The following year saw him foreman of the molding and packing department of the New York Belting & Packing Co., Passaic. Then Mr. Litchfield returned to International as superintendent. His next connection was with Goodyear.

He lives in Akron. He belongs to the Masonic Order, Knights Templars, Society of Automotive Engineers, Portage Country and Akron City clubs; is a past president of the Akron Boy Scouts Council, of the Akron Chapter of the National Aeronautic Association, of the Rubber Association of America (1928); served as director of the United States Chamber of Commerce; was a member of the code authority for the rubber tire manufacturing industry under the NRA; and has been on several other government commissions during the war and after. He is also the author of many articles on industrial, business, and aeronautical subjects.

On June 23, 1904, Mr. Litchfield and Florence Brinton were married. They have two daughters and four grandchildren.

California Plant's Record

First Goodyear tire manufactured on the Pacific Coast was built June 14, 1920. Recently the California factory, in Los Angeles, produced its 28,000,000th tire, subsequently presented to Mayor Frank L. Shaw by California-Goodyear's vice president and general superintendent, W. H. Fleming. Mayor Shaw was among those present when the first California-Goodyear tire was made.

From an intial year's production of 345,000 tires, output has grown into millions annually; in 1936 the tonnage of crude rubber consumed reached an all-time high. Additional to its manufacture of 28,000,000 tires, California-Goodyear has built approximately a like number of tubes.

New Recreation Hall

The new recreation hall at the Goodyear Gadsden, Ala., plant opened on December 24 with the annual Children's Christmas Party. The main floor comprises a large auditorium, lounging rooms, and a canteen; in the basement are storage compartments, locker room, and shower baths. Purpose of the hall is to serve as a center of employe activities.

Outlook for '38

In summing up his opinion of what the new year may bring, W. O'Neil, president, General Tire & Rubber Co., Akron, says:

"Business is actually better than the stock market indicates. The country's greatest need is for more private building.

"Building wages are too high per hour and too low per year. The present high hourly rates not only prevent persons from building who would build if costs were lower but they also hurt the builders themselves. A reasonable lowering of building labor costs would immediately set in motion a flood of building operations. . . .

"Of course, building labor is entitled

(*Continued on page* 96)

NEW ENGLAND

THERE seems to be a slightly better tone to the principal New England industries. Although shoe operations have not picked up much, many manufacturers are receiving a larger volume of incoming orders, probably because distributers' stocks appear to have been liquidated substantially. Some fabric mills also note a slight improvement. No change of importance, however, is seen in general manufacturing activities, which are severely depressed, particularly in the heavy industries; and employment has dropped further.

Dexter North, chief of the Chemical Division of the United States Tariff Commission, has resigned to join Arthur D. Little, Inc., research chemist and engineer, Cambridge, Mass., as its Washington technical representative. In his new work Mr. North will continue to obtain and assemble technical, economic, and statistical information concerning the chemical and other process industries from the many active sources at Washington. Through his present association, however, similar investigations will be made directly for industrialists as a part of the technical investigations made by the Little laboratories for their clients. Mr. North, a native of Brookline, Mass., is a graduate of Hamilton College (1913) and of the Massachusetts Institute of Technology (1916). Since 1921 he has been successively special expert and chief of the Chemical Division of the Tariff Commission, where he directed the gathering of information regarding the chemical and related industries. He is a son of the late Dr. S. N. D. North, secretary of the National Association of Wool Manufacturers from 1890 to 1903, and Director of the Census under the administration of Theodore Roosevelt.

Hill & Lacrosse Co., manufacturer of elastic tape, braids, etc., since 1914, East Greenwich, R. I., has been declared insolvent. Judge Charles A. Walsh in Superior Court for Providence County has appointed Conrad K. Strauss receiver. The appointment was made upon the petition of Celia C. Lacrosse Floody, president, treasurer, and a creditor of the company. The receiver's bond was placed at $10,000. The company has been employing more than 200 workers and was declared by Mrs. Floody's counsel as being insolvent. She is owner of 502 shares of the firm's stock.

Ernest L. Kilcup, president-treasurer of the Davol Rubber Co., Providence, R. I., was reelected a director of the Providence Chamber of Commerce. He was one of the speakers at the conference of the New England members of the National Association of Credit Men held at the Narragansett Hotel, Providence, on November 17.

Henry George Tyer

Company Vice President

Henry George Tyer, vice president of the Tyer Rubber Co., Andover, Mass., manufacturer of footwear, druggists' sundries, molded specialties, rubber bands, mechanicals, etc., comes from a family long identified with the rubber industry. He joined the company in 1907 and that same year was made a director. He started in the factory and later was transferred to the sales and export departments. Mr. Tyer was elected president in 1917, but the next year left to enter the Artillery Officers' Training School in Kentucky. When he returned to civilian life, he resumed his business career.

His birthday is February 5, 1885; his birthplace, Andover, Mass., his schools, Phillips-Andover Academy and Harvard University (A.B., 1907); his clubs, Harvard of Boston and of New York. At one time Mr. Tyer was a member of the Rubber Association of America. He is fond of the woods in which he lives and is addicted to chess as a hobby.

He is married to Winifred LeBoutiller, and they have two daughters. Their home is at Sunset Rock Rd., Andover.

Firestone Rubber & Latex Corp., 172 Ferry St., Fall River, Mass., with an authorized capitalization of $1,000,000, consisting of 10,000 shares of $100 par value each, filed articles of incorporation with the Secretary of State in Boston. The officers recorded are: chairman of the board, Harvey S. Firestone; president, Horace C. Miller; treasurer, Timothy F. Doyle; secretary, John H. Joss, all of Akron; clerk, Richard K. Hawes, of Westport Harbor, Mass.; directors, Messrs. Firestone, Miller, and Hawes, John W. Thomas, of Akron, and Lincoln P. Holmes, of Fall River.

Blue Hill Observatory of Harvard University, Milton, Mass., according to recent article by Chas. B. Pear, Jr., in its meteorological work has long been engaged with the problem of how to make observations of the state of the atmosphere at great heights above the earth. First, observations of clouds were made from the tops of high hills and mountains. Later attempts were made with kites carrying recording instruments. For the greatest heights balloons carried the instruments. During the last few years airplanes have been sent up daily. The latest device employed is the radio-meteorograph, a very light instrument carried by four-foot balloons, generally of latex, but sometimes of Cellophane, and employing a radio transmitter which sends back the record as fast as its component instruments measure it. The recent series of 25 ascents made by the Blue Hill Observatory with this latest means checked the results secured simultaneously by airplane ascents, and on the average soared in all kinds of weather to elevations of 50,000 feet compared to 17,000 for airplanes.

At the Blue Hill Observatory the ingenious method of placing a parachute inside of the balloon has been devised. Thus the parachute is protected from the possibility of being loaded with ice and when the balloon bursts, the parachute is released to lower the instrument. Single balloons are used only in connection with parachutes to protect the instrument when falling.

In view of this the Weather Bureau advertised for bids for flights using radio-meteorographs as well as for airplane flights, at the different aerological stations for 1938. In consequence the airplane at Boston will be replaced by the radio-meteorograph this year. Besides there will also be a series of ascents by the Weather Bureau at Washington.

Continental Elastic Corp., an affiliate of the European concern, Elastic, A.G., which operates several mills in Switzerland, France, and Germany, according to current reports has leased the Nashawena Mills, New Bedford, Mass., where operations will begin about April 1. The necessary machinery to be installed is of a highly specialized type and developed by company engineers. The firm will manufacture all kinds of braided elastic fabrics to be sold to makers of men's and women's wearing apparel, also a finished product for department and chain stores. After operations begin the concern expects to employ about 150 workers. Frederic Putnam is active executor of the concern, and associated with him in an executive capacity will be Frederic Ruhroth, with Koenig & Hansmann, engineering firm, in charge of the operation of the machines.

(Continued on page 76)

NEW JERSEY

FURTHER recession in business is reported among New Jersey rubber manufacturers. Two plants found it necessary to close for several days. Some factories are operating with small orders after the usual volume of business took a sharp downward trend. Manufacturers, however, are confident that there is business to be had as soon as confidence has been restored. One manufacturer declared that the trade would become much better at the beginning of the new year. The slump is felt in all lines of rubber production.

Mercer Rubber Co., Hamilton Square, found December showed a better business trend in 1937 than in 1936, but large orders declined. The concern was compelled to lay off some help, but expects to run normally again after the new year.

The Lambertville Rubber Co., Lambertville, closed for several days, resumed operations in all departments on December 13. President John T. Crowley, permanent trustee by appointment of the Federal Court, announced sufficient orders are on hand to keep the plant in operation for several weeks. Asked concerning the reported sale of the concern to a New York manufacturer, Mr. Crowley refused to comment.

Kelly-Springfield Tire Co., according to a ruling by Federal Judge Fake, Newark, was granted an over-allowance of $600,181 by the Internal Revenue Bureau for 1918. The judge had first ruled that the tire company was entitled to a federal tax refund of $1,927,241. As the result of a re-hearing directed by the United States Circuit Court of Appeals, following an appeal by the government from the first ruling, Judge Fake filed a new opinion.

Jos. Stokes Rubber Co. found business dropped off at both its Trenton and Canadian plants. Milton H. Martindell, vice president and secretary-treasurer, was on a business trip through the Midwest.

Puritan Rubber Co., Trenton, reports a decreased output of rubber tiling. Officials are looking forward to a revival during the winter.

Rubber Manufacturers' Association of New Jersey postponed its December meeting until January because of the death of President John A. Lambert.

The Alligator Rubber Products Co., Inc., 239 Ridgewood Ave., Newark, has purchased property on both Badger Ave. and West Runyon St., which it will hold for future expansion. Both plots comprise 40,000 square feet. The company contemplates erecting a new building in the spring.

Essex Rubber Co., Trenton, continues to operate normally. Lawrence Oakley, company executive recently returned from a business trip through New England, believes conditions will improve with the new year.

The Thermoid Co., Trenton, employing more than 1,000 workers, through President Fred J. Schluter, has served notice on the employes that it will not renew the labor contract with the Rubber Workers' Union. Mr. Schluter charged the union, a C.I.O. affiliate, with violation of the contract and declared that the agreement was cancelled. He said: "We will not operate a closed shop and nobody will have to pay dues to work for Thermoid." He charged that the union violated its contract time and time again and that it will not be renewed when it expires on January 31 next.

Pequanoc Rubber Co., manufacturer of reclaimed rubber, Butler, according to President J. F. McLean, is erecting a storehouse for scrap. The new building, covering more than 3,000 square feet, is of brick and timber.

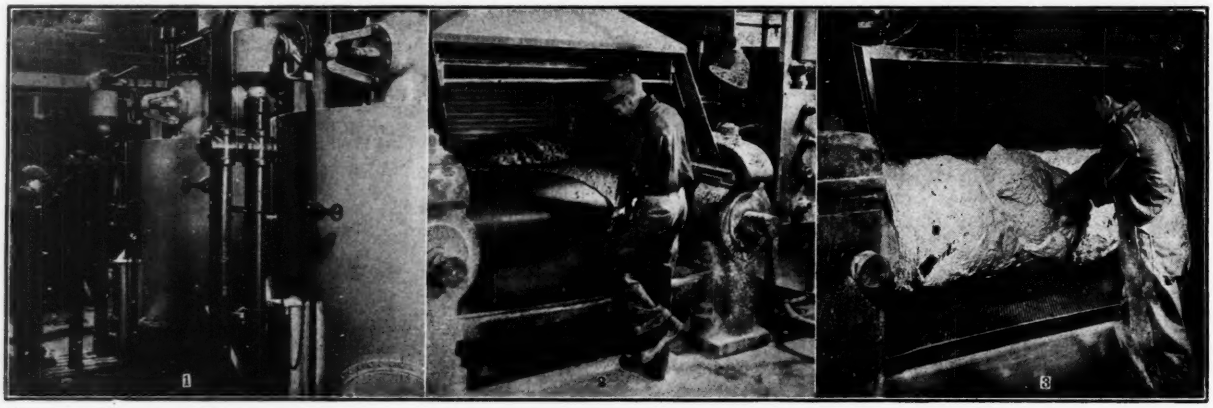
Luzerne Rubber Co., Trenton, experienced a decline in orders for hard rubber products.

MIDWEST

THE unusually severe and early winter weather in the midwest has adversely affected trade, but here, of course, as with the rest of the country, Christmas sales were expected to help offset resulting losses. Employment continues to drop. One district, however, reported a large number of leather footwear workers recalled to their jobs, which even more to be sent for later in anticipation of the spring shoe demand. But other plants are on light schedules except for the chemical industries, which are running on a fair basis.

Automobile assemblies average about 86,000 units per week. There was also reported a large accumulation of new and used cars in the hands of dealers. One authority stated that the number of automotive units produced in 1938 will depend on the extent to which labor's contractual obligations are recognized as well as the size of the present remainder of the pent-up demand for cars resulting from deferred buying during the depression.

Duffy-Latex Co., a new company in Holland, Mich., it is reported, will soon start production on auto accessory parts.



Photos through courtesy of du Pont company

Three Views of the Deepwater Point, N. J., Plant of E. I. du Pont de Nemours & Co., Inc.

Fig. 1. Acetylene Gas Generator Used in the Manufacture of Neoprene. Fig. 2. Standard Rubber Mill for Blending Neoprene. Fig. 3. Rubber Mill for Washing Neoprene

Rubber Industry in Europe

GREAT BRITAIN

Dusting Powder for Rubber

Some years ago Fordyce Jones suggested the use of dusting powders to prevent smoked sheet from becoming gummed up during transportation and at the same time to protect surfaces from foreign matter. After various powders had been tested, zinc stearate was finally hit upon, and now over a period of more than three years has given good results. Rubber dusted with this material, when it is packed at the plantation, practically falls out of the cases when unpacked on arrival; the sheets can easily be separated, which point is especially important when they are destined for the manufacture of surgical goods, in which instance the sheets have to be inspected; furthermore the fine powder prevents any kind of foreign matter, even splinters, from sticking into or penetrating the rubber. The percentage of zinc stearate on the rubber is so small (he would be surprised if it is as much as 0.5% on the rubber, says Mr. Jones) that it need not be taken into consideration in compounding. In any case it is not objectionable in the ordinary mix. Mr. Jones expresses surprise that more use has not been made of this simple process and feels sure that rubber so treated would find a readier market than some gummed-up blocks.

Synthetic Rubber Preparedness

Following the example of many countries to render themselves independent of important raw materials, Great Britain will establish its own carbide industry. Carbide, produced from coal and lime, is the base for acetylene, which in turn is the basis of a wide variety of products including synthetic rubber. Many different countries have already started the production of carbide and acetylene and in some, Germany, for instance, this is already proceeding on a large scale and is due to increase enormously in the future.

Great Britain, which imports annually between 50,000 and 60,000 tons of carbide at a cost of about £1,000,000, is now to open two factories for home production of this important material: one in South Wales, where work has already begun, and the other in Scotland. It is calculated that it will take about two years to complete the necessary factories, power plants, etc., at which time production should begin; but once this is in full swing, Great Britain will have available the necessary materials for a synthetic rubber industry on which it can fall back in an emergency.

New Rubber Road

Early last year an experiment was conducted with a new kind of road surfacing called Rubermatic,[1] a special composition of rubber and bitumen which could easily be dumped on to any sound road bed, raked, rolled like asphalt, and then be ready for traffic as soon as it was cold. Another section has been laid with this surfacing on Clifton Rise for the Metropolitan Borough of Deptford. Much heavy traffic, chiefly horse-drawn coal vans, passes down this hill, and drivers must apply skids to the wheels before descending it. But the new road appears to stand up well under this severe test. Incidentally, this is said to be the first time that rubber surfacing has been laid on a hill and under these conditions.

[1] India Rubber World, Apr. 1, 1937, p. 67.

Notes

The 1938 Empire Exhibition, the greatest held anywhere in the world since the Empire Exhibition at Wembley in 1924, is scheduled for Bellahouston Park, Glasgow, Scotland, from May to October.

The 1938 British Industries Fair will be held February 21 to March 4, simultaneously in three halls, Castle Bromwich, Birmingham, and Olympia and Earls Court, London. A record demand for space is announced, with Holland so far in the lead.

The first ordinary dividend since 1932-1933, when 8% was turned out, was paid by the Avon India Rubber Co., Ltd., for the year ended September 30, 1937. The distribution came to 7% on the £296,842 ordinary capital.

To reduce noise at important stations the L.N.E. Railway equipped 365 platform barrows with solid rubber tires and intends to fit 476 more.

The reconstruction of J. Mandleberg & Co. has been formally approved by shareholders. It is proposed to reduce the issued capital of £714,243 by £277,121 10s. by writing down the preferred ordinary shares from £1 to 16s. and the ordinary shares from £1 to 10s. No part of the capital reduction is to fall on the 7% cumulative preference shares, but the holders are asked to forego one of the four years' arrears of dividend outstanding on December 31, 1936, and to accept funding certificates in discharge of the other three years' arrears amounting to £11,025. These certificates, to bear interest at the rate of 5% per annum, will be redeemable out of the profits of the company, before providing for the current cumulative preferential dividends, in six yearly instalments, or earlier. The company may now be considered to be on a profit-earning basis.

Prolongation of Patent Refused

Recently Dr. Philip Schidrowitz, London, and Vultex, Ltd., St. Helier, Jersey, submitted a petition for prolongation of a patent in connection with the production of vulcanized latex. There were two patents, it seems, one of which was a patent addition which expired on September 23, 1937. The petition asked for a further extension of ten years, but this was dismissed on the grounds that there had not been the necessary care in the presentation of the accounts and disclosure of material was required and expected in cases of prolongation.

POLAND

Experiments in the production of synthetic rubber have also been conducted in Poland, and a rubber has been produced, known as "ker." This is now made on a laboratory scale from alcohol. It does not appear likely that it will be produced on a large scale at present because of its high cost. Work in this direction seems to have been undertaken purely with possible military needs in view.

The Polish rubber industry appears to be continuing on the road to recovery and production is still increasing. To be sure, a decline occurred in the output of rubber shoes during the first nine months of 1937, when 3,140,000 pairs were produced, against 3,480,000 pairs in the corresponding period of 1936; but galoshes totaled 1,400,000 pairs, value 4,170,000 zloty, against 1,060,600 pairs, value 2,790,00 zloty, and snow shoes came to 740,000 pairs, value 3,285,000 zloty, against 390,000 pairs, value 1,470,000 zloty. Crude rubber imports rose rather sharply from 3,653 tons to 4,660 tons, and tire imports increased from 758 to 853 tons. There was also a considerable increase in the exports of rubber footwear from a value of 170,000 zloty to 500,000 zloty.

GERMANY

Rubber Import Duty Up

The German import duty on crude rubber, which was raised to 125 marks per 100 kilos in May, 1937, has further been increased to 160 marks per 100 kilos, with corresponding increases in the duties on latex.

Use of Plastics

At the last Achema and again at the Leipzig Fall Fair the comprehensive displays of plastics and articles made from them emphasized the important role that these products are now taking in industry here, which fact is due in large part to Germany's policy of self-sufficiency combined with her lack of native raw materials. Papers on the subject were read at both the rubber and the chemical conventions held in connection with the National Convention of German Chemists in Frankfurt.

At the annual meeting of the Deutsche Kautschukgesellschaft, July 5, 6, 7, 1937, Adolf Schwartz discussed plastics with special reference to the needs of the rubber industry. The vinyl-polymerization products, he pointed out in the course of his paper, have proved the most useful for the rubber industry, particularly those that are by nature soft and elastic, and of these the acryl acid esters and the Oppanols are the most important. The acryl acid esters not only possess the high aging resistance common to all the other thermoplastics, but excel for making coil-end closures and the like because of their resistance to benzine and oils, properties which have been made use of particularly in the cable industry, and they are finding their way into both the cable and rubber industries as oil and benzine resistant components in rubber and Buna mixes.

Of all the thermoplastics, the Oppanols, and more particularly Oppanol B, most nearly resemble rubber in regard to elasticity, but even Oppanol B is inferior to rubber in resilience. Oppanol B retains its elasticity from minus 50 to over 100° C., after which it gradually passes over to a plastic, formable state. It has extraordinary resistance to chemicals, good aging resistance, is practically odorless and tasteless, and has dielectric values superior to those of rubber. In a pure state, however, it deforms easily, even at ordinary temperatures, although suitable lacquer coatings and compounding with pigments, especially carbon black, overcome this defect. Oppanol B is useful chiefly for proofing double texture materials and as lining for elastic tubing for use under conditions where its tastelessness and lack of odor are advantageous. But its greatest value would seem to lie in the fact that it can be mixed with Buna and rubber in any proportion and thus improve the qualities of the mix with regard to aging and oil-resistant qualities, while at the same time the Buna or rubber in the mix prevents the deformation to which this plastic is liable. The field for its application in combination with rubber or Buna seems to be especially promising in the electrical industry as then dielectric values, unattainable with pure rubber mixes, could be reached.

Vinyl resins are in part also polymerized to emulsions whose stability has been constantly improved, and new fields are also opening up for them particularly as bonding material in the manufacture of imitation leather or for coating fabrics or paper.

Among the best known vinyl resins which are not naturally soft and elastic, but become so by the addition of suitable softeners is polyvinylchloride marketed here under the name Igelite. Igelites MP and PCU can be mixed with softeners in any proportion, and the resultant gels remain soft and elastic over a wide range of temperature, depending on the softener used. Some Igelite masses remain soft and retain their shape over temperatures ranging from minus 30 to over 70° C.; they are used in the manufacture of gas and water tubing, packing rings and cords, floor coverings to take the place of rubber runners, and for coating fabrics; they also serve as insulation material for low tension wires under temperature conditions not exceeding 60° C.

At the National Convention of German Chemists, Dr. Hans Prillwitz discussed vinylpolymerizates from the point of view of their importance as lacquers and coatings. The following points are of interest to the rubber industry.

Polyvinyl acetate films, used as grounding, adhere well to most metals except to light ones, but this defect is easily remedied by the addition of small amounts of basic pigments as zinc oxide, when exceptionally good adhesion results. Thus prepared, they have proved very suitable for the most varied coatings, including chlorinated rubber lacquers and are already finding much favor in airplane construction. Polyvinyl acetate can be combined with only a limited number of coating materials, but these few are very important. It combines readily with chlorinated rubber, thereby enhancing the adhesion of the latter on many different surfaces.

The acryl acid esters, known to the local trade as Plexigum or Acronal, when suitably compounded, appear promising for varnishing all kinds of rubber objects, particularly rubber balls. Among the possibilities listed for products of this type may be mentioned: substitute for shellac dressing on raincoats and rubber fabrics of all kinds, with or without the addition of polyvinyl acetate; benzine resistant coats on rubber, artificial leather, etc., also in combination with polyvinyl acetate, stretching latex groundings with polyacryl acid ester emulsions, to raise resistance to cold and aging.

The soluble polyvinylchloride marketed under the name of Vinoflex has properties similar to those of chlorinated rubber particularly in regard to chemical resistance—and in Germany competes with the latter to a certain extent.

EUROPEAN NOTES

During the struggle for Torrelavega, Province of Santander, Spain, the tire factory established there by the Continental Gummi-Werke A.G., Hannover, Germany, was damaged. It has, however, so far been restored that operations with a staff of 100 have again begun. For the present, output is confined to automobile tires.

The convention for technical rubber goods established in Czechslovakia about one year ago was recently dissolved chiefly as a result of differences between the Optimit, Gummi-und Textilwerke A.G., Prague, and J. Kudrnac & Co., Nachod. The other adherents of the agreement, which had aimed to fix and maintain prices and discounts, included the Matador Gummiwerke A.G., Prague; J. Hakauf & Sohne, Koniggratz; Veritas Gummiwerke A.G., Grottau; Fr. Stepanek & Co., Prague; and Asbestos, Asbest-und Gummiwerke G.m.b.H., Zverinek. It had been the intention eventually to form a cartel. Negotiations to form a new convention have begun, but so far have yielded no results.

After a recession in 1936 Italian crude rubber imports increased again in 1937. The figures are 18,374 metric tons for the first nine months of 1937, 13,864 tons for the same period of 1936, and 15,456 tons in 1935. At the same time latex imports rose from 724 metric tons in 1935 to 439 tons in 1936 to 968 tons in 1937. Rubber imported for reclaiming purposes showed a similar trend; the respective figures are 1,715 tons, 326 tons, and 3,081 tons.

The Danish rubber manufacturing concern A. S. Schionnig & Arve, Copenhagen, reports net profits of 578,-859 kroner for the year ended August 31, 1937, against 573,107 kroner the year before. A dividend of 8% plus a 2% bonus was again distributed, and 32,287 kroner carried forward.

Russian crude rubber imports declined somewhat during 1937. The total for the first nine months was 21,-748 tons against 23,008 tons in the same period of the previous year. However exports of rubber manufactures increased rapidly from 174 metric tons, value 587,000 rubles, to 870 tons, value 4,239,000 rubles.

(*Continued on page* 80)

Rubber Industry in Far East

NETHERLAND INDIA

New Rubber Road

A new method of making road surfaces and floors is described in a recent issue of the *Algemeen Landbouwweekblad* by B. W. H. Fermin. It is claimed that the new process makes it possible to lay a rubber surface on a stone or bituminous bed at low cost; while at the same time a perfect bonding of surface and road-bed is obtained. To achieve this, the bed is covered with an intermediate layer consisting of trass, preserved latex, sulphur, accelerators, and protective colloid, on top of which is laid the final surface which may be prepared according to an already known process in which the rubber content after drying is about 40%.

Trass, it is claimed, has been found to be an excellent medium for binding the rubber-containing layer to the ground bed; in this respect it is said to be superior to cement. Hence a smaller proportion of trass can be used to obtain good bonding giving a road that has a higher rubber content and therefore more of the characteristics of a rubber road than a similar road in which the rubber amounts to only a small percentage of the whole. A further advantage of the use of trass is that it leads to a considerable lowering in cost. The amount of latex in the lower layer may be such that after drying, the rubber content is about 15%. If the amount of latex is reduced so that the final rubber content is 10%, then it is advised to apply two thinner intermediate layers instead of one thicker layer, the second having a rubber content of 20 to 25%. The more rubbery character of the intermediate layer in turn helps to achieve excellent bonding with the top layer.

The lower layer or layers should have altogether a thickness of 3 mm., and the cover of about 2 mm., giving a total thickness of 5 mm. A part of the trass may be replaced by an equal amount of cement, whereby the hardening process is hastened. If the bed is bituminous, it should first be spread with an adhesive mixture; a combination of petroleum asphalt and natural asphalt, of low penetration value, in the proportion of 2:1, is recommended.

A mix for the intermediate layer could be prepared as follows: With 100 parts, by weight, of 35% latex preserved with ammonia and containing 10%, on the latex, of a protective colloid, are mixed 5 parts sulphur, 1 zinc white, ½-part ultra-accelerator, and 200 parts trass. This is thoroughly stirred to a homogeneous mass. Part of the trass may be replaced by an equal amount of cement. The mixture is spread over the previously moistened stone bed to a thickness of about 3 mm. This layer dries rapidly, and as soon as it is almost dry, the top layer is applied.

A sample formula for the surface follows: To a mixture of 10 parts of sulphur, 5 zinc white, 25 kaolin, 2½ gas black, 90 cement, 1 accelerator, and ½ part antioxidant, is added enough latex to give a final rubber content of 40% when the mix is dry. The latex should preferably be ammoniated and contain 4%, on the latex, of a protective colloid. After this mass is thoroughly mixed, at first by hand and then in a ball-mill, it is poured into a container and allowed to rest. In a few hours it thickens to a paste which will keep for at least three or four days without lumping or coagulating. This paste is spread out as before. In the tropics it dries very rapidly, and in dry weather is hard enough to walk on after one day; after two days it will bear wheel traffic.

Rubber Exports

September, 1937, exports from Netherland India totaled 39,075,087 kilos according to final figures issued by the Central Bureau of Statistics, Buitenzorg, Java. Estate rubber from Java and Madoera accounted for 6,511,068 kilos, dry weight, including 5,934 kilos of latex; besides this 7,759 kilos were exported in the form of tires.

Exports of estate rubber from the Outer Provinces were 12,900,956 kilos dry weight and included 1,463,573 kilos latex. Native rubber shipments were 19,655,304 kilos dry weight.

For the first nine months of 1937 estate rubber exports came to 162,659 tons in all, against a quota of 169,454 tons, showing a shortage of 6,795 tons. However this is completely covered by stocks in the hands of exporters. These stocks are covered by licenses and can be exported immediately if necessary. At the end of August they amounted to 7,149 tons.

Native rubber exports during the first nine months of 1937 totaled 175,-108 tons; as the quota, including the 1936 carry-over is 156,020 tons, this shows an excess of 19,088 tons. The figures indicate that Netherland India is fully capable of reaching its quotas and also suggest that native productive capacity has been under- rather than over-estimated.

MALAYA

Buddings vs. Seedlings

The question of the relative value of the best buddings and seedlings of known origin is one frequently discussed, and advocates of seedlings are quick to raise again all the old objections to buddings. Criticisms of budded trees are largely based on a close comparison of buddings with the ideal type of seedling. In such a comparison buddings suffer because they differ in so many important respects from the seedlings. But it is necessary to judge the merits of seedlings and buddings by quite different standards. One should not look at a budding with a "seedling-eye," as C. E. T. Mann puts it in "Tapping of Budded Trees."[1]

Different Characters of Seedlings and Buddings

Mr. Mann points out some important differences in the characters of the two types of trees in relation to tapping practice. A typical seedling tapers in a more or less pronounced manner from ground level to a height of about four feet, after which the decrease in girth is more gradual and the trunk is practically cylindrical up to the first branches. The trunk of a budded tree is almost cylindrical all the way from the union with the stock to the first lateral branches.

Bark Thickness and Structure

In the seedling the bark thickness decreases as the girth diminishes, with accompanying change in bark structure; the number of latex vessels in the inner soft bark, for instance, is 50% greater at the base than at a height of 40 inches. In a typical budded tree the bark shows much less variation in thickness and number of latex vessels.

The most noticeable difference in the bark structure of seedlings and buddings is to be found in the development of corky bark. Whereas in the seedling this non-latex-bearing, but protective corky layer represents from one-third to one-half the total bark thickness, in most budded trees it is less than 10% of the total bark thickness. As if to compensate for this deficiency, however, the stone cell layer, which lies between the cork and the innermost soft, latex-bearing bark, is thicker in buddings than in seedlings; the inner, latex-bearing tissue is about the same for both types of trees.

Special Care in Tapping Buddings

The thicker corky layer of the seedling, although it contributes nothing to

[1] *J. Rubber Research Inst. (Malaya)*, Oct., 1937.

the latex yields, offers several minor advantages. Thus it provides a firm channel along which the tapper's knife can work smoothly, which helps to minimize the risk of wounding. Tappers have to accustom themselves to tapping on the smoother and much thinner cork bark of the budgrafts; they find they must not only be careful to tap deep enough and yet not wound the tree, but must also cut at a steeper angle if the latex is not to overflow the shallower channel provided by the thinner bark; again the more delicate bark of the buddings makes it necessary to use spouts of lighter construction than is usual and to adopt a type of latex-cup hanger that does not penetrate the bark; also the tapping knife must be narrower.

Yield and Height of Cut

When a seedling is tapped, yield is found to decrease markedly with the increase in tapping height. If yield at a height of 25 inches is taken as 100%, it is 150% at ground level, and 75% at 50 inches. In buddings the difference in yield at 20 and 40 inches is only about 10%; in some cases there is practically no difference at all. As the tapping cut descends toward the place of union of stock and scion, yields do not increase, but may actually decrease. Indeed experiments have suggested that it is advisable to leave budded trees untapped from six to eight inches from the union.

From all this it is clear that buddings require a tapping system devised with special consideration for their peculiarities if they are to give full satisfaction.

Bark Renewal

One of the main points of attack against buddings has been their bark renewal. Thinness of primary bark and slow bark renewal are clonal characters. In the early years of budding insufficient information was available, and many of the earliest clones recommended have since had to be dropped. Much of the prejudice against buddings is to be ascribed to unfortunate experiences with these first buddings. Mr. Mann cites data from tests on approved clones which indicate that the structure of the inner layer of renewed bark is practically identical with that of virgin bark. Any difference in total bark thickness is chiefly due to the smaller development of the stone cell layer in the renewal bark.

Yields

It is often doubted whether the high yields obtained from young buddings will be maintained or increased with age as is the case with seedlings. Mr. Mann gives figures showing that so far there seems to be no cause for anxiety on this score. Data from a number of estates where buddings are now being tapped show that on the whole yields are up to expectations.

We note that actual records of the yields of large budded areas in commercial tapping are difficult to obtain. This seems to be due to the fact that extensive planting of proved buddings dates from 1928 so that trees would not have been ready for commercial tapping before 1934. The introduction of restriction has made it unnecessary to tap young areas prior to 1937. Most estates have been able so far to get their full quota from mature areas at a lower cost than would have been possible in the long run even from high yielding young budded areas. At present, cost per pound is still a more important consideration than yield per acre.

SIAM

Those interested in rubber usually reserve their attention for the main rubber producing centers — Malaya, Netherland India, and Ceylon—giving little or no thought to the smaller producers. But meanwhile these develop and promise to become important factors in the rubber industry in the not very distant future. Take Siam for instance. Until restriction was introduced, Siam, as a rubber producer, was almost unknown to most people; her shipments of rubber were below even those of British North Borneo. In 1933 her exports came to only 7,765 tons, the highest figure reached by her up to that time; but in 1934 it was 17,714 tons, in 1935, 28,327 tons, and in 1936, 34,578 tons. During the first nine months of 1937 exports totaled 27,713 tons, against 25,981 tons in the same period of 1936. Under the International Agreement, Siam's basic quota is 40,000 tons, of which it was permitted to export 75% in 1935 and 95% in 1936. Judging by the trend of exports in the preceding four years, when an average of 28% of the total shipments was made in the last quarter, Siam should ship altogether about 38,500 tons during the whole of 1937, or 2,500 tons above the permissible amount.

INDO-CHINA

Exports of crude rubber from Indo-China during the first nine months of 1937 came to 30,207,533 kilos. So far the largest shipments were made in July when over 5,000,000 kilos were sent out. The exports during the next quarter will have to average this amount per month if the total of 45,000 tons is to be reached for the year, which is decidedly below the estimated output of 50,000 metric tons for 1937. However those in circles considered competent to judge estimate that the year's shipments will total 47,000 tons. It has, incidentally, been remarked that Indo-China exports are highly seasonal, shipments tending to increase toward the end of the year. Exports during the last quarter in recent years have averaged 34.25% of the total annual shipments.

CEYLON

The agitation for the immediate revision of the basic quota has simmered down very considerably of late, and planters on the whole do not appear disposed to push the matter just now. Their assessments are liberal, and they are doing much better than they have done for years.

JAPAN

From recent reports it appears that a rubber importers' association will be formed in Japan in the near future. This step is to be taken in connection with the enforcement of distribution control and crude rubber import control. The Japan Rubber Importers' Society (Gomu Yunyu Kyokai) is said to have appointed new officials to organize the new importers' association.

Shiraishi Kogyo Kaisha, Ltd,. manufacturer of Hakuenka and light and heavy calcium carbonate, Nishiente-Cho, Naniwaku, Osaka, Japan, has changed its name and address to Shiraishi Shoji Kaisha, Ltd., 1062 Tumorityo, Nisinariku, Osaka.

New England

(*Continued from page* 71)

The Washburn Wire Co., the General Scrap Iron Co. lessee, is erecting a storeroom and locker room building in connection with its plant on Bourne Ave., East Providence, R. I.

B. B. Rubber Corp., scrap rubber dealer, 40 Seymour St., Providence, R. I. Upon petition of Harry Broomfield, president, Presiding Justice J. E. O'Connell of the Superior Court appointed a receiver and granted an order of dissolution of the corporation. Mr. Broomfield filed ownership papers with the City Clerk's office, Providence, as sole owner of the B. B. Rubber Co., now conducting a similar business at the same address.

Rubber Lubricant

To fulfill a requirement created by the increased use of rubber parts in machines, a patented composition, designed for rubber lubrication, is now available. The lubricant is applicable to rubber mechanical elements such as used in the spring shackles of automobiles, where a softening action accompanies the usual lubricating agents. This lubricant consists essentially of a combination of colloidal graphite, glycerine, and water. In applying it to surfaces of small area and those difficult to reach, a needle spray gun is effective, but for larger areas that are readily accessible guns giving a wider coverage are useful.

Patents and Trade Marks

MACHINERY

United States

2,100,321. **Tire Inflator.** J. H. Cox, Los Angeles, Calif.
2,100,461. **Tire Mold Cutter.** L. M. Watson and R. F. Ternes, both of Detroit, Mich., and L. G. Budlong, Mt. Vernon, assignor to United States Rubber Products, Inc., New York, both in N. Y.
2,100,478. **Tire Retreader.** L. O. Grange, assignor to Safety Vulcanizer Co., both of Chicago, Ill.
2,100,571. **Apparatus for Making Latex Articles.** A. N. Spanel, Rochester, N. Y.
2,100,572. **Form for Making Latex Articles.** A. N. Spanel, Rochester, N. Y.
2,100,574. **Pouch Making Form.** A. N. Spanel, Rochester, N. Y.
2,100,575 and 2,100,576. **Rubber Article Form.** A. N. Spanel, Rochester, N. Y.
2,100,577. **Apparatus for Making Latex Sheeting.** A. N. Spanel, Rochester, N. Y.
2,100,578. **Form for Making Garments.** A. N. Spanel, Rochester, N. Y.
2,100,627. **Tire Vulcanizing Core.** F. L. Bucy and V. A. La Rock, both of Eau Claire, Wis.
2,101,252. **Rubber Article Mold.** R. H. Guinzburg, Flushing, assignor to I. B. Kleinert Rubber Co., New York, both in N. Y.
2,101,508. **Apparatus for Manufacturing Mats.** H. M. Pryale and S. C. Clark, assignors to Baldwin Rubber Co., all of Pontiac, Mich.
2,101,654. **Molded Article Finisher.** E. A. Sheehan, Stoughton, assignor to Panther-Panco Rubber Co., Inc., Chelsea, both in Mass.
2,101,906. **Machine for Making Pile Fabric.** E. Hopkinson, assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.
2,102,054. **Apparatus for Treating Carbon Black.** E. Billings, Weston, and H. H. Offutt, Winchester, assignors to Godfrey L. Cabot, Inc., Boston, all in Mass.
2,102,453. **Automatic Stock Take-Off Machine.** W. W. Benner, Ithan, and F. Leopold, Jr., Harmonville, assignors to Lee Rubber & Tire Corp., Conshohocken, all in Pa.

Dominion of Canada

369,956. **Rubber Thread Producing Machine.** Easthampton Rubber Thread Co., assignee of K. R. Shaw, both of Easthampton, Mass., U. S. A.
370,027. **Rubber Sheet and Linoleum Cutter.** P. W. Lamson, Cleveland Heights, O., U. S. A.
370,383. **Tire Mold Cutter.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of L. M. Watson and R. F. Ternes, both of Detroit, Mich., and L. G. Budlong, Mt. Vernon, N. Y., co-inventors, all in the U. S. A.
370,508 **Vulcanizer.** Boston Woven Hose & Rubber Co., Cambridge, assignee of J. M. Bierer, Waban, both in Mass., U. S. A.
370,534. **Heel Making Apparatus.** Mishawaka Rubber & Woolen Mfg. Co., assignee of R. R. Hunt, both of Mishawaka, Ind., U. S. A.
370,555. **Shoe Bottom Shaper.** United Shoe Machinery Co. of Canada, Ltd., Montreal, P. Q., assignee of H. A. Davenport, Brockton, Mass., U. S. A.

United Kingdom

470,448. **Covering Machines.** Easthampton Rubber Thread Co.
470,505. **Pneumatic Tires.** Dunlop Rubber Co., Ltd., H. Smith, and G. C. Brentnall.
470,916. **Tire Molding and Vulcanizing Apparatus.** Dunlop Rubber Co., Ltd., and H. Willshaw.
470,941. **Rubber Rolling Machines.** C. K. Morrison, (Guthrie & Co., Ltd.).
471,420. **Elastic Thread Knitter.** G. Spencer, Ltd., and G. H. Spencer.

Germany

653,329. **Equipment and Process for Making Rubber Thread.** H. Schuller, E. Matzner and A. Kailich, all of Vienna, Austria. Represented by H. Scheidegger, Berlin.
653,550. **Roll Drive.** Fried. Krupp Grusonwerk A.G., Magdeburg-Buckau.

PROCESS

United States

20,561. (Reissue). **Curing Rubber Articles.** F. L. Bucy and V. A. La Rock, both of Eau Claire, Wis.
2,100,029. **Porous Rubber Product.** J. R. Gammeter, Akron, O., Assignor to United States Rubber Co., New York, N. Y.
2,100,085. **Vulcanized Rubber Production.** H. O. Newman, Waterbury, Conn., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.
2,100,492. **Pneumatic Sheet Material.** J. J. Sindler, assignor to Converse Rubber Co., both of Malden, Mass.
2,100,714. **Rubber Composition.** G. S. Hiers, Bala-Cynwyd, assigner to Collins & Aikman Corp., Philadelphia, both in Pa.
2,101,206. **Ribbed Separators.** L. E. Wells, Cleveland Heights, assignor to Willard Storage Battery Co., Cleveland, both in O.
2,101,255. **Pessaries.** R. M. Hay, New York, N. Y., assignor to Durex Products, Inc.
2,101,318. **Applying Ornamental Bead to Wheel Disk.** G. A. Lyon, Allenhurst, N. J.
2,101,714. **Rubber Coated Article.** A. J. Keeney, Cuyahoga Falls, O.
2,101,752. **Elastic Threads.** R. Pickles, Burnley, and J. Pickles, Fence, both in England.
2,101,905. **Pile Fabric.** E. Hopkinson, assignor, by mesne assignments, to United States Rubber Co., both of New York, N. Y.
2,101,907. **Rubber Articles.** V. H. Hurt, Naugatuck, Conn., assignor to United States Rubber Products, Inc., New York, N. Y.
2,101,915. **Rubber Composition.** R. R. Olin, Akron, assignor to Worthington Ball Co., Elyria, both in O.
2,102,456. **Treating Rubber Articles.** A. K. Brill and W. A. Wake, assignors to Republic Rubber Co., all of Youngstown, O.

Dominion of Canada

370,050. **Rubber Product.** T. L. Shepherd, London, England.
370,054. **Synthetic Rubber.** E. I. du Pont de Nemours & Co., Wilmington, Del., assignee of W. S. Calcott, Penns Grove, F. B. Downing, Carneys Point, both in N. J., and D. H. Powers, Providence, R. I., co-inventors, all in the U. S. A.
370,085. **Belt Manufacture.** Cela Holding S. A., assignee of L. S. M. LeJeune, both of Paris, France.
370,086. **Covering Material.** Certain-Teed Products Corp., New York, assignee of A. Whittemore, Bronxville, both in N. Y., U. S. A.
370,190, 370,191, and 370,202. **Rubber Product.** T. L. Shepherd, London, England.
370,259. **Garment.** Narrow Fabric Co., W. Reading, assignee of C. J. Busch, Wyomissing, and O. E. Huber, Reading, co-inventors, all in Pa., U. S. A.
370,360. **Permeable Body Production.** American Hard Rubber Co., New York, N. Y., assignee of K. E. Hunt, Pequannock, N. J., U. S. A.
370,384. **Coated Structure.** E. I. du Pont de Nemours & Co., Wilmington, Del., assignee of W. H. Charch, Buffalo, N. Y., and D. B. Maney, Old Hickory, Tenn., co-inventors, all in the U. S. A.
370,544. **Expanded Rubber Manufacture.** Rubatex Products, Inc., assignee of D. Roberts, both of New York, N. Y., U. S. A., and T. A. Scott and F. W. Peel, both of Wembley, England, co-inventors.
370,545. **Expanded Rubber Manufacture.** Rubatex Products, Inc., assignee of D. Roberts, both of New York, N. Y., U. S. A.
370,546. **Expanded Rubber.** Rubatex Products, Inc., assignee of D. Roberts, both of New York, N. Y., U. S. A., and T. A. Scott, Wembley, Middlesex, and F. W. Peel, London, both in England, co-inventors.
370,547. **Expanded Rubber.** Rubatex Products, Inc., New York, N. Y., U. S. A., assignee of F. W. Peel, London, England.

United Kingdom

470,171. **Vent Plugs.** Chloride Electrical Storage Co., Ltd. (J. L. Woodbridge).
470,198. **Tire Fabrics.** Preston Tire Fabric Mfg. Co., Ltd., and F. Chadwick.

470,331. **Reenforced Chlorinated Rubber.** N. A. De Bruyne and De Havilland Aircraft Co., Ltd.
470,378. **Rubber Sheets.** International Latex Processes, Ltd.
470,403. **Cutting Rubber.** Easthampton Rubber Thread Co.
470,722. **Rubber Sheets and Tapes.** International Latex Processes, Ltd., E. A. Murphy, and R. G. James.
470,843. **Treating Bulbs.** G. E. Heyl.
470,851. **Ropes and Cords.** Dunlop Rubber Co., Ltd., and J. Anderson.
470,900. **Stretching Fabrics.** International Latex Processes, Ltd.
470,910. **Treating Bulbs.** G. E. Heyl.
471,036. **Collapsible Vestibules for Railway Vehicles.** M. Hautot.
471,126. **Compound Sheet Materials.** H. W. Franklin and J. G. Franklin & Sons, Ltd.
471,135. **Sandals.** H. W. Franklin and J. G. Franklin & Sons, Ltd.
471,179. **Rubber Soled Footwear.** A. Chadwick.
471,857. **Levers.** S. Smith.

CHEMICAL

United States

2,100,370. **Vulcanizing Agent.** I. Williams, Woodstown, N. J., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del.
2,100,692. **Accelerator.** M. W. Harman, Nitro, W. Va., assignor, by mesne assignments, to Monsanto Chemical Co., Wilmington, Del.
2,100,997. **Preservation of Rubber.** P. S. Russel, assignor to Detroit Lubricator Co., both of Detroit, Mich.
2,100,998. **Rubber Preservative.** R. L. Sibley, Nitro, W. Va., assignor, by mesne assignments, to Monsanto Chemical Co., St. Louis, Mo.
2,101,089. **Latex Stabilization.** I. J. Novak, assignor to Raybestos-Manhattan, Inc., both of Bridgeport, Conn.
2,101,223. **Chlorinated Rubber Stabilizer.** J. G. Moore, Runcorn, England, assignor to Imperial Chemical Industries, Ltd., a corporation of Great Britain.
2,102,547. **Accelerator.** L. B. Sebrell, Silver Lake, O., assignor to Wingfoot Corp., Wilmington, Del.

Dominion of Canada

369,765. **Accelerator.** Wingfoot Corp., Wilmington, Del., assignee of A. M. Clifford, Stow, O., both in the U. S. A.
369,954. **Vulcanizing Agent.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. L. Fisher, Leonia, N. J., U. S. A.
370,177. **Moisture - Proofing Coating Composition.** M. F. Monbiot, London, **England.**
370,233. **Rubber - Halogenated Polyphenyl Composition.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of F. M. Clark and J. H. Koenig, co-inventors, both of Pittsfield, Mass., U. S. A.
370,276. **Chlorinated Rubber Composition.** M. Roumazeilles, Joinville LePont, Seine, and R. Harle, Pitres, Eure, co-inventors, both in France.
370,526. **Insulating Composition.** Insulation Development Corp., assignee of B. D. McIntyre, both of Monroe, Mich., U. S. A.

United Kingdom

470,090. **Coating Compositions.** E. I. du Pont de Nemours & Co.
470,168. **Synthetic Rubber Compositions.** Hercules Powder Co.
470,225. **Rubber Ink.** Michelin & Cie.
470,259. **Preservative Coating Compositions for Rubber.** O. P. Swift.
470,268. **Chlorinated Rubber.** L. T. Dod and Imperial Chemical Industries, Ltd.
470,269. **Material for Bonding Synthetic Rubber.** B. J. Habgood, L. B. Morgan, and Imperial Chemical Industries, Ltd.
470,391. **Reclaimed Rubber Compositions.** Johnson & Johnson (Great Britain), Ltd., (Johnson & Johnson).
470,405. **Accelerators.** A. G. Murray, G. E. Nettleship, and Imperial Chemical Industries, Ltd.
470,482. **Gelatine Solvent.** E. I. du Pont de Nemours & Co.
470,636. **Antioxidants.** Rohm & Haas Co.
470,778. **Chlorinated Rubber Compositions.** I. G. Farbenindustrie A.G.
470,782. **Fibrous Plastic Compositions.** R. S. Tompsett.
470,791. **Accelerators.** Rubber Service Laboratories Co.
470,897. **Resinous Dielectric Compositions.** British Thomson-Houston Co., Ltd.
471,112. **Rubber Dye.** G. W. Johnson, (I. G. Farbenindustrie A.G.).
471,214. **Protective Composition for Dry Cells.** National Carbon Co., Inc.
471,215. **Rubber Phenol - Aldehyde Compositions.** Beck, Koller, & Co. (England), Ltd.
471,324. **Latex Coating Compositions.** G. Smith, C. H. Graff, and J. C. Wastall.
471,415. **Rotproofing and Waterproofing Materials.** National Processes, Ltd., and W. J. Carter.
471,440. **Chlorinated Rubber.** M. F. Monbiot and British Rayophane, Ltd.
471,613. **Coating Compositions.** Firestone Tire & Rubber Co., Ltd.
471,679. **Aqueous Rubber Paints.** Rubber Producers Research Association, H. P. Stevens, and S. C. Stokes.
471,979. **Synthetic Resin Compositions.** H. Plauson.
472,454. **Compound Sheet Material.** Celluloid Corp.

Germany

652,277. **Accelerator.** I. G. Farbenindustrie, A.G., Frankfurt a.M.
652,704. **Mortar Masses Containing Rubber.** I. G. Farbenindustrie, A.G., Frankfurt a.M.
652,749. **Electrical Insulation Material.** Siemens & Halske A.G., Berlin-Siemensstadt.
652,833. **Treating Rubberized Fabric Surfaces.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands. Represented by C. and E. Wiegand, both of Berlin.
653,330. **Coagulates from Aqueous Rubber Dispersions.** Dewey & Almy Chemical Co., Cambridge, Mass., U. S. A. Represented by G. Lotterhos, Frankfurt a.M.
653,685. **Rubber Objects with Spongelike or Cellular Structure.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands. Represented by R. and M. M. Wirth and C. Weihe, all of Frankfurt a.M., and T. R. Koehnhorn, Berlin.

GENERAL

United States

2,099,521. **Baseball Bat.** H. W. Herkimer and H. E. Holcomb, Niagara Falls, N. Y.
2,099,809. **Floor Covering.** G. G. Hunter, H. M. Pryale, and S. C. Clark, assignors to Baldwin Rubber Co., both of Pontiac, Mich.
2,099,870. **Pneumatic Cushion.** H. C. Stanley and W. H. Smith, Manchester, England.
2,099,884. **Milking-Machine Inflation.** G. W. Green, Wilmette, Ill., assignor to B. F. Goodrich Co., New York, N. Y.
2,100,084. **Tire Tread.** G. K. McNeill, Detroit, Mich., assignor to United States Rubber Products, Inc., New York, N. Y.
2,100,096. **Dispensing Container.** J. R. Bedell, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,100,097. **Machine Gun Fire Control Apparatus.** G. E. Beharrell, Streetly, J. Wright, Coventry, and H. Trevaskis, Sutton Coldfield, assignors to Dunlop Rubber Co., Ltd., London, all in England.
2,100,138. **Cleaning Device Bristle.** F. Heldt, Gelsenkirchen, Germany.
2,100,163. **Girdle.** M. Goodman, assignor to Neatform Co., Inc., both of New York, N. Y.
2,100,539. **Antiskid Device.** H. S. Fritts, assignor of one-half to H. S. Bowers, both of Washington, N. J.
2,100,573. **Flat Sheet Latex Article.** A. N. Spanel, Rochester, N. Y.
2,100,642. **Gear Shift Lever and Resilient Mount.** H. D. Geyer, Dayton, O., assignor to General Motors Corp., Detroit, Mich.
2,100,643. **Automobile Radio Antenna.** H. D. Geyer, Dayton, O., assignor to General Motors Corp., Detroit, Mich.
2,100,986. **Body Molding Garment.** H. A. and M. E. Smith, both of Fairfield, Conn.
2,101,003 and 2,101,004. **Elastic Strand.** W. J. Fox, assignor to J. R. Kendrick Co., Inc., both of Philadelphia, Pa.
2,101,027. **Dusting Mitten.** D. Karger, assignor to Eagle Knitting Mills, Inc., both of Milwaukee, Wis.
2,101,102. **Doll.** E. G. Schaeffer, New York, N. Y., assignor to C. E. Bowers, Washington, D. C.
2,101,273. **Massage Instrument.** W. D. Smith, Kalamazoo, Mich.
2,101,310. **Hair Tinting Applicator.** T. F. Callaghan, Toronto, Ont., Canada.
2,101,473. **Ball.** G. S. Lannom, Jr., assignor to Lannom Mfg. Co., both of Grinnell, Iowa.
2,101,628. **Ice Bag.** V. B. Padelford, Washington, D. C.
2,101,646. **Toy.** B. L. Gordon, Jr., assignor to Hogan Inventions, Inc., both of Philadelphia, Pa.
2,101,716. **Brassiere.** S. W. Kunstadter, assignor to Formfit Co., both of Chicago, Ill.
2,101,734. **Net Cap.** J. S. Chapple, assignor of one-half to B. V. Chotzner, both of Hove, England.
2,101,761. **Metatarsal Cushion Rest.** J. E. Stagl, Brooklyn, N. Y.
2,101,869. **Vibration Reducing Means.** W. Noble, Michigan City, Ind., assignor to Sullivan Machinery Co., a corporation of Mass.

2,101,874. **Composite Fabric.** W. W. Rowe, Cincinnati, assignor to Paper Service Co., Lockland, both in O.
2,101,883. **Paving Joint Filler.** L. E. Warner, Bond Hill, O., assignor to Phillip Carey Mfg. Co., a corporation of O.
2,102,010. **Protective Device for Flexible Conduits.** G. J. Kopp, Allston, Mass.
2,102,050. **Nipple.** J. B. Whitbread, Detroit, Mich.
2,102,064. **Stocking.** C. C. Foster, Westville, N. J., assignor to Chesterman-Leeland Co., Philadelphia, Pa.
2,102,067. **Heel.** G. W. Griffith, Norwalk, Conn.
2,102,072. **Rotary Tool Joint.** F. J. Hinderliter, Tulsa, Okla.
2,102,129. **Cable.** S. J. Rosch, Yonkers, assignor to Anaconda Wire & Cable Co., New York, both in N. Y.
2,102,164. **Heat Insulated Receptacle.** A. H. Payson and C. O. Duevel, Jr., assignors to American Thermos Bottle Co., both of Norwich, Conn.
2,102,265. **Overshoe.** B. Halberstadt, New York, N. Y.
2,102,273. **Corset.** M. Laguzzi, W. Haven, assignor to Strouse Adler Co., New Haven, both in Conn.
2,102,323. **Swimming Trunks.** A. R. Kneibler, assignor to Coopers Inc., both of Kenosha, Wis.
2,102,358. **Tire Wire.** F. C. Elder, Cleveland, O., assignor to American Steel & Wire Co. of N. J., a corporation of N. J.
2,102,368. **Arch Supporting Stocking.** E. J. Martel, Laconia, N. H.
2,102,369. **Garter Stocking.** E. J. Martel, Laconia, N. H.
2,102,486. **Hosiery.** R. H. Scheer, New Holland, assignor to Vanity Fair Silk Mills, Reading, both in Pa.
2,102,523. **Blood Transfusion Machine.** S. J. Ferrara and W. E. Deen, both of Peru, Ind.
2,102,551. **Tire Safety Ring.** A. W. Woodward, Kent, O., assignor to Wingfoot Corp., Wilmington, Del.
2,102,561. **Garter.** E. O. Loeber, Cleveland, assignor to W. W. Taylor, E. Cleveland, both in O.

Dominion of Canada

370,043. **Wringer.** C. B. Williams, Cleveland, O., U. S. A.
370,069. **Tire and Fabric.** Goodyear Tire & Rubber Co., assignee of R. P. Dinsmore, both of Akron, O., U S. A.
370,123. **Electrical Conductor.** Rockbestos Products Corp., New Haven, assignee of J. W. Greenleaf, Hamden, both in Conn., U. S. A.
370,135. **Electrical Conductor.** Western Electric Co., Inc., New York, N. Y., assignee of L. L. Weaver, Cranford, and C. A. Webber, Westfield, co-inventors, both in N. J., all in the U. S. A.
370,166. **Traveling Rug.** K. P. P. Herpich, Berlin - Charlottenburg, Germany.
370,194. **Elastic Attaching Device.** A. Solosko, Chicago, Ill., U. S. A.
370,255. **Garment.** Model Brassiere Corp., Brooklyn, N. Y., assignee of M. C. Baatz, South Orange, N. J., both in the U. S. A.
370,280. **Asphalt Emulsion.** J. L. Armour, Toronto, Ont.
370,301. **Elastic Plaster Bandage.** F. Homann, Hannover, Germany.
370,359. **Carboy Cushion.** American Cyanamid & Chemical Corp., New York, assignee of R. W. Lahey, New Rochelle, both in N. Y., and H. A. Kast, Erie, Pa., co-inventors, all in the U. S. A.
370,364. **Floor Covering.** Baldwin Rubber Co., assignee of S. C. Clark, both of Pontiac, Mich., U. S. A.
370,365. **Floor Covering.** Baldwin Rubber Co., assignee of S. C. Clark, H. M. Pryale, and D. R. Cotterman, co-inventors, all of Pontiac, Mich., U. S. A.
370,381. **Oscillating Joint.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. W. Steiner, Detroit, Mich., U. S. A.
370,382. **Cord Covered Core Manufacture.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of J. A. Muller, Clifton, N. J., U. S. A.
370,517. **Sole and Heel.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of W. L. Pipes, now deceased, Elizabeth, N. J., U. S. A.
370,521. **Insulating Coating.** B. F. Goodrich Co., New York, N. Y., assignee of W. L. Semon, Silver Lake, O., both in the U. S. A.

United Kingdom

469,556. **Linear Dimension Gages.** H. E. Kleinschmidt.
469,616. **Grinding Wheels.** British United Shoe Machinery Co., Ltd., and F. Nown.
469,647. **Electric Killing Appliances.** A. D. Clarke, H. F. Roberts, and G. H. Vaughan.
469,667. **Nonconducting Coverings for Sound.** A. Fleck and Imperial Chemical Industries, Ltd.
469,745. **Hooks.** M. H. Goldstone.
469,769. **Bandages.** H. Ryner.
469,785. **Paper Making Machine Press Rolls.** W. H. Millspaugh.
469,793. **Toothbrushes.** E. Singer.
469,864. **Vibration Dampers.** Junkers Flugzeug-Und-Motorenwerke A.G.
469,908. **Coating Webs.** British Celanese, Ltd., A. Mellor, and W. Pool.
469,975. **Surgical Discharge Collecting Appliances.** A. Murray.
470,017. **Elastic Fabrics.** T. J. Smith & Nephew, Ltd., and H. R. Spencer.
470,050. **Screw Fans.** Samson United Corp.
470,076. **Tires.** T. L. Garner and John Bull Rubber Co., Ltd.
470,101. **Collapsible Tubes.** A. Carpmael, (G. E. Dunkle).
470,110. **Bush Extractors.** V. H. Hayes-Pankhurst.
470,117. **Bottle Stoppers.** P. F. La Roche.
470,162. **Vibration Dampers.** A. H. Stevens, (American Steel Foundries).
470,196. **Machine Guns.** Dunlop Rubber Co., Ltd., J. Wright, and H. Trevaskis.
470,233. **Batteries.** Chloride Electrical Storage Co., Ltd.
470,256. **Windings for Dynamo Electric Machines.** M. Sigmund.
470,261. **Pulleys.** F. M. Schwabe.
470,264. **Vehicle Luggage Carriers.** A. A. Puig.
470,345. **Coated Fabrics.** S. G. Barker and J. G. O'Connell.
470,359. **Squeegees.** M. P. F. Rosengaard.
470,447. **Stamping Press Relief Device.** A. M. Erichsen.
470,465 and 470,479. **Toy Vehicles.** H. Muller.
470,561. **Batteries.** Chloride Electrical Storage Co., Ltd.
470,563. **Can Closures.** A. Richards.
470,568. **Corset Stiffeners.** W. R. Weeks.
470,581. **Aircraft Landing Wheel Brakes.** Dunlop Rubber Co., Ltd., J. Wright, and H. Trevaskis.
470,582. **Therapeutic Garments.** H. Ryner.
470,600. **Kinematograph Apparatus.** W. Smith, J. C. Hall, and J. B. Barton.
470,611. **Respirator.** R. Eisenmenger.
470,627. **Spray Producers.** F. Goldschmidt.
470,644. **Shoe Brakes.** Bendix Aviation Corp.
470,655. **Wheels.** Dunlop Rubber Co., Ltd., C. E. Goodyear, and G. E. Sharp.
470,675. **Compound Sheet Materials.** Naamlooze Vennootschap Maatschappij Tot Beheer En Exploitatie Van Octrooien.
470,686. **Friction Wheels.** W. and A. Hackel, trading as Hackel, Geb.
470,723. **Pneumatic Sucker Fastenings.** S. Kalman.
470,749. **Boot Making Machines.** British United Shoe Machinery Co., Ltd., and W. T. B. Roberts.
470,850. **Respiratory Appliances.** J. A. Sadd.
470,854. **Elastic Garment Bands.** K. Elsbach.
470,862. **Cables.** Pirelli-General Cable Works, Ltd., and J. L. Bishop.
470,882. **Surgical Pumps.** G. Botteri.
470,889. **Driving Belts.** E. Gessner A.G.
470,967. **Valves.** India Rubber, Gutta Percha & Telegraph Works Co., Ltd., and F. J. Tarris.
471,091. **Gloves.** W. Pinkham & Son, Ltd., and W. Pinkham.
471,122. **Cables.** A. W. Williams.
471,335. **Binders.** C. Chivers, Ltd., and E. W. Wall.
471,345. **Machinery Guards.** A. Herbert, Ltd., and P. A. Morris.
471,377. **Brushes and Squeegees.** T. Potter.
471,531. **Rollers.** W. H. Smith & Son, Ltd., (Standard Register Co.).
471,536. **Cable End Sleeves.** J. Lepetit.
471,659. **Wheel Tires.** Firestone Tire & Rubber Co., Ltd. (Firestone Tire & Rubber Co.).
471,663. **Handles.** Redfern's Rubber Works, Ltd., and G. S. Grote.
471,718. **Cars.** F. W. Fraser.
471,722. **Inflating Valves.** G. B. Jensen.
471,735. **Abdominal Supports.** E. Field.

Germany

653,395. **Belt.** J. F. Huth, Brunn, Czechoslovakia. Represented by E. F. Eitner, Berlin.
653,700. **Felloe for Pneumatic-Tired Wheels.** Deutsche Dunlop Gummi-Co., A.G. Hanau.

TRADE MARKS

United States

352,147. **Superlite.** Wires and cables. General Cable Corp., New York, N. Y.
352,149. **Tire Cancer.** Patching kits. Bowes Seal Fast Corp., Indianapolis, Ind.

352,205. **Atlas.** Tire adhesive. Atlas Supply Co., Newark, N. J.

352,346. **Vitaflo.** Nipples, nipple retaining caps, etc. Pyramid Rubber Co., Ravenna, O.

352,347. Representation of a burning torch above the word **"Nuprime."** Electric storage batteries. M. Bosworth, doing business as Supreme Battery Co., Brooklyn, N. Y.

352,350. **Coolaire.** Automobile seat covers. Firestone Tire & Rubber Co., Akron, O.

352,378. **Signal Tread.** Tires and tubes. Pharis Tire & Rubber Co., Newark, O.

352,381. Representation of a double diamond with the letter **"S"** in the middle. Rubber packing, rubber and fabric packing, composite rubber packing, rubber belting, etc. H. A. Greene, doing business as M. L. Snyder & Son, Philadelphia, Pa.

352,383. **Hydromatic.** Tires. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

352,395. **Metric.** Machinery packing. Hewitt Rubber Corp., Buffalo, N. Y.

352,490. **Freflo.** Paint brushes. Rubberset Co., Newark, N. J.

352,508. **Lifegard.** Life preservers. Lifegard Co., Inc., Chicago, Ill.

352,513. Representation of a diamond containing the letters **"Meds."** Prophylactic goods. Griffsen Rubber Co., Philadelphia, Pa.

352,578. **Mars-Chroma.** Erasers. J. S. Staedtler, Nuremberg, Germany.

352,588. Representation of a label with several lines across, a star, and the words: **"Philson"** and **"Mark of Quality."** Suspenders and garters. P. Leventhal & Sons, New York, N. Y.

352,609. **Style Craft.** Automobile seat covers. B. F. Goodrich Co., New York, N. Y.

352,640. Representation of a label with a diamond and the word **"Rubnu"** in the middle. Preparation for waterproofing, preserving, and polishing rubber and rubber treated goods. S. Rizzuto, doing business as Rubnu Co., Brooklyn, N. Y.

352,648. **Bone-Flex.** Corsets and girdles. Belfit Foundations Inc., New York, N. Y.

352,657. **E-Z-DO by Bonzette.** Girdles, corsets, etc. Bonzette Foundations, Inc., New York, N. Y.

352,658. **Satin Seraphim.** Corsets and brassieres. Garfinkel & Ritter, New York, N. Y.

352,660 and 352,855. **Stay-Lastic.** Elastic fabrics. C. A. Cosman, New York, N. Y.

352,664. **Roto-Bak.** Suspenders. Swank Products, Inc., Attleboro, Mass.

352,668. Representation of a ruled label with a streamer, a semi-circle between a girl in evening clothes and one in underwear, and the word **"E-Z-On Panteez."** Girdles. Imperial Mfg. Co., New York, N. Y.

352,670. **Realastic.** Lace containing rubber or elastic. Acme Textiles Inc., New York, N. Y.

352,675. **Viso-Tog.** Rain suits, jackets, coats, etc. A. L. Siegel Co., Inc., New York, N. Y.

352,686. **Lazy Gal.** Corsets and brassieres. Garfinkel & Ritter, New York, N. Y.

352,687. **Lazy Lizzie.** Corsets and brassieres. Garfinkel & Ritter, New York, N. Y.

352,688. **Lazy Pals.** Corsets and brassieres. Garfinkel & Ritter, New York, N. Y.

352,698. **Impies.** Brassieres and girdles. Gluckin Corp., New York, N. Y.

352,716. Representation of two diamonds and a wreath with the letter **"G"** between them. Storage batteries and electricians' tape. B. F. Goodrich Co., New York, N. Y.

352,728. **Hy-Buoy.** Buoys. Rubbercraft Corp. of California, Ltd., Los Angeles, Calif.

352,815. Representation of a man in modernistic design stretching some elastic, and the number **"17."** Elastic fabrics, belting, etc. C. A. Cosman, New York, N. Y.

352,836. **Contro.** Elastic thread. Andrews-Alderfer Co., Akron, O.

352,915. **"Darleen."** Piece goods including elastic webbings, elastic sheetings, etc. Darlington Fabrics Corp., New York, N. Y.

EUROPEAN NOTES

(Continued from page 74)

S.A. Compagnie Generale des Tissus pour Impermeables, Brussels, Belgium, was recently formed and capitalized at 100,000 francs. The firm is to manufacture and sell waterproofed fabrics.

Automobile tire and tube exports from France came to 60,088 quintals during the first nine months of 1937, more than half the total going to French possessions. Of the other countries, Belgium, Netherlands and Netherland India, and Switzerland were the best customers.

Bata Establishing Carbon Black Factory in Rumania

Bata, A.S., Czechoslovakia's largest producer of footwear and in recent years an important manufacturer of tires, has confirmed a report that the company is establishing a carbon black plant in Rumania, to be known as "Romcar." The amount to be invested has not been disclosed, but Bata expects to cover his entire carbon black requirements from the "Romcar" plants.

If this is the case, American carbon black exporters, the leading suppliers to this market, will lose one of their largest Czechoslovak consumers of this commodity. A leading Bata official stated, however, that the company is not interested in marketing carbon black in Czechoslovakia and that even if it were, the relatively high cost of production would not permit the Rumanian product to compete on the Czechoslovak market with imported American carbon black. The main incentive, it was disclosed, for establishing the Rumanian plant is to remove remittance difficulties with respect to Bata shoes and other products sold in Rumania.

It is understood that the Rumanian Government has agreed to accord to "Romcar" tax reductions and other statutory privileges designed to promote domestic industry in Rumania.

Among other things the fact that Bata is undertaking this production program in Rumania appears to indicate that the quality of domestically manufactured carbon black (really lamp black made from crude naphthalene) is still not high enough to permit of its efficient and general use in tire production, even though it suffices for the manufacture of various inks, rubber heels, and certain other rubber products. Coarseness of texture and relatively high content of ash, sulphur, and tar have been reported as the chief shortcomings of the local product. Being made from the same raw material as American carbon black, that is, from natural gas, the quality of Rumanian carbon black should compare favorably with that originating in the United States.

Preliminary Czechoslovak foreign trade statistics covering the first eight months of 1937 indicate that 1,383 metric tons of carbon black, in a value of 6,001,000 crowns,[1] were imported as against 897 metric tons and 3,527,000 crowns in the first eight months of 1936. The preliminary figures indicate that imports from the United States rose from 531 metric tons and 1,927,000 crowns in the period January-August, inclusive, 1936, to 1,089 metric tons and 4,626,000 crowns in the same period of 1937. Shipments from Germany, second largest supplier in the local market, decreased from 194 metric tons and 791,000 crowns to 187 metric tons and 770,000 crowns.

The following table gives Czechoslovak imports of carbon black in 1936, by countries, together with partially classified figures for the first eight month of 1936 and 1937.

[1] One Czechoslovak crown equals $0.035 U.S. currency at the present rate of exchange. Prior to the second devaluation of the crown on October 10, 1936, the rate was about $0.0414.

Czechoslovak Imports of Carbon Black*

			January - August†			
	1936		1936		1937	
Country of Shipment	Metric Tons	1,000 Crowns	Metric Tons	1,000 Crowns	Metric Tons	1,000 Crowns
United States	1,106	4,069	531	1,927	1,089	4,626
Germany	286	1,322	194	791	187	770
Hamburg (transit)	208	862	...	...	...	...
Netherlands	47	215	...	...	...	...
France	25	135	...	...	...	...
Great Britain	23	135	...	...	...	...
Austria	16	44	...	...	...	...
Belgium	12	41	...	...	...	...
All other countries	15	140	172	809	107	605
	1,738	6,963	897	3,527	1,383	6,001

*Source of Information: An official at Bata A.S., Czechoslovak foreign trade statistics.
†Preliminary, not classified in detail by coountries.

Market Reviews

CRUDE RUBBER

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES

Futures	Oct. 30	Nov. 27	Dec. 4	Dec. 11	Dec. 18	Dec. 25
Nov. ...	15.70	.....	.....	.....	.....	.....
Dec. ...	15.74	14.57	15.50	15.38	15.01	15.12
Jan. ...	.....	14.66	15.59	15.47	15.01	15.12
Mar. ...	15.77	14.76	15.74	15.62	15.20	15.30
July ...	15.88	15.02	16.00	15.85	15.42	15.51
Sept. ...	15.94	15.12	16.10	15.95	15.52	15.61
Oct. ...	.....	15.17	16.15	16.00	15.57	15.66
Volume per week (tons) ..	33,650	11,060	22,160	8,500	7,470	6,700

HE Commodity Exchange table published here shows prices of representative future contracts on the New York market during the past two months.

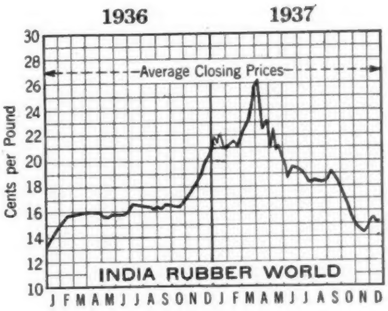
On November 27 the price for July futures was 15.02¢ per pound and rose sharply to 16¢ per pound on December 4, following action of the International Rubber Regulation Committee in reducing the exportable quota of crude rubber. After this rise the market dropped to close at 14.85¢ per pound on December 31. During the past four weeks the maximum variation in prices for delivery during the next year was 0.62¢ per pound. Trading totaled 14,920 tons during the week ending November 27, rising to 22,160 tons the following week. Trading for the weeks ending December 11, 18, and 25 was less than 10,000 tons.

The export quota for rubber was reduced on November 30 from 90 to 70% of basic production for the first quarter of 1938 by the International Rubber Regulation Committee in London. This cut was more than the markets had anticipated, and prices for the commodity rose sharply following the announcement. Permissible exports under the restriction scheme will be lowered to 226,669 tons during the first quarter of 1938, as compared with 283,362 tons during the current quarter, a reduction of 56,693 tons. This decrease is expected to offset the decline in American consumption. The action of the I.R.R.C., in addition to bolstering the crude market, should avert heavy inventory losses for American rubber goods manufacturers.

On the following page of this issue are reported United States statistics on imports, consumption, stocks, and crude rubber afloat during November.

New York Outside Market

Buying interest has been lacking during December, with factories not disposed to enter commitments for rubber until the inventory period is ended. Shipment business with the Far East has been slow, offerings being too far out of line for acceptance. After closing at 14 1/2¢ per pound on November 29, No. 1 ribbed smoked sheets jumped to 15 5/16¢ upon the new quota announcement the following day. The price was easier during December, fluctuating between 14 5/8 and 15 9/16¢ per pound, and closing at 14 5/8¢ per pound on December 31.



New York Outside Market—Spot Ribbed Smoked Sheets

The week-end closing prices on No.

New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	Nov. 22	Nov. 23	Nov. 24	Nov. 25*	Nov. 26	Nov. 27	Nov. 29	Nov. 30	Dec. 1	Dec. 2	Dec. 3	Dec. 4	Dec. 6	Dec. 7	Dec. 8	Dec. 9	Dec. 10	Dec. 11	Dec. 13	Dec. 14	Dec. 15	Dec. 16	Dec. 17	Dec. 18
No. 1 Ribbed Smoked Sheet	14	14 3/8	14 5/8	..	14 11/16	14 5/8	14 1/2	15 5/16	15	15 1/8	15 1/2	15 1/2	15 5/16	15 1/4	15 1/4	15 9/16	15 1/2	15 3/8	15 3/16	15	15	15 1/8	15 1/16	15 1/16
No. 2 Ribbed Smoked Sheet	13 3/4	14 1/8	13 3/8	..	14 7/16	14 3/8	14 1/4	15 1/16	14 3/4	14 7/8	15 1/4	15 1/4	15 1/16	15	14 15/16	15 1/4	15 3/16	15 1/16	14 7/8	14 11/16	14 5/8	14 3/4	14 9/16	14 9/16
No. 3 Ribbed Smoked Sheet	13 1/4	13 5/8	13 3/4	..	13 15/16	13 7/8	13 3/4	14 9/16	14 1/4	14 3/8	14 3/4	14 3/4	14 9/16	14 1/2	14 7/16	14 13/16	14 3/4	14 5/8	14 7/16	14 1/4	14 1/4	14 3/8	14 3/16	14 3/16
No. 4 Ribbed Smoked Sheet	13	13 3/8	13 5/8	..	13 11/16	13 5/8	13 1/2	14 5/16	14	14 1/8	14 1/2	14 1/2	14 5/16	14 1/4	14 1/4	14 5/8	14 9/16	14 7/16	14 1/4	14 1/16	14	14 1/8	13 15/16	13 15/16
No. 1 Thin Latex Crepe...	14 1/2	14 7/8	14 7/8	..	14 7/8	14 7/8	14 3/4	15 9/16	15 1/4	15 3/8	15 3/4	15 3/4	15 9/16	15 1/2	15 1/2	15 13/16	15 3/4	15 5/8	15 7/16	15 1/4	15 1/4	15 3/8	15 5/16	15 5/16
No. 1 Thick Latex Crepe..	14 1/2	14 7/8	14 7/8	..	14 7/8	14 7/8	14 3/4	15 9/16	15 1/4	15 3/8	15 3/4	15 3/4	15 9/16	15 1/2	15 1/2	15 13/16	15 3/4	15 5/8	15 7/16	15 1/4	15 1/4	15 3/8	15 5/16	15 5/16
No. 1 Brown Crepe.......	13 1/8	13 1/2	13 3/4	..	13 3/4	13 3/4	13 5/8	14 7/16	14 1/8	14 1/4	14 5/8	14 5/8	14 7/16	14 3/8	14 3/8	14 11/16	14 5/8	14 1/2	14 5/16	14 1/8	14 1/8	14 1/4	14 3/16	14 3/16
No. 2 Brown Crepe.......	13	13 3/8	13 5/8	..	13 5/8	13 5/8	13 1/2	14 5/16	14	14 1/8	14 1/2	14 1/2	14 5/16	14 1/4	14 1/4	14 9/16	14 1/2	14 3/8	14 3/16	14	13 15/16	14 1/16	14	14
No. 2 Amber............	13 1/8	13 1/2	13 3/4	..	13 3/4	13 3/4	13 5/8	14 7/16	14 1/8	14 1/4	14 5/8	14 5/8	14 7/16	14 3/8	14 3/8	14 11/16	14 5/8	14 1/2	14 5/16	14 1/8	14 1/8	14 1/4	14 3/16	14 3/16
No. 3 Amber............	13	13 3/8	13 5/8	..	13 5/8	13 5/8	13 1/2	14 5/16	14	14 1/8	14 1/2	14 1/2	14 5/16	14 1/4	14 1/4	14 9/16	14 1/2	14 3/8	14 3/16	14	13 15/16	14 1/16	14	14
No. 4 Amber............	12 1/4	12 5/8	12 7/8	..	12 7/8	12 7/8	12 3/4	13 9/16	13 1/4	13 3/8	13 3/4	13 3/4	13 9/16	13 1/2	13 1/2	13 13/16	13 3/4	13 5/8	13 7/16	13 1/4	12 7/8	13	13 1/4	13 1/4
Rolled Brown...........	10 1/2	10 7/8	11 1/8	..	11 1/8	11 1/8	11	11 13/16	11 1/2	11 5/8	12	12	11 13/16	11 3/4	11 1/2	11 13/16	11 5/8	11 1/2	11 5/16	11 1/8	11 5/8	11 3/4	11 5/8	11 5/8

*Holiday.

New York Outside Market (Continued)

December, 1937	20	21	22	23	24	*25
No. 1 Ribbed Smoked Sheet.............	15	15 5/16	15 1/16	15	15 1/8	..
No. 2 Ribbed Smoked Sheet.............	14 9/16	14 3/4	14 5/8	14 9/16	14 11/16	..
No. 3 Ribbed Smoked Sheet.............	14 1/8	14 5/16	14 3/16	14 1/8	14 1/4	..
No. 4 Ribbed Smoked Sheet.............	13 15/16	14 1/8	14	13 15/16	14 1/16	..
No. 1 Thin Latex Crepe................	15 1/4	15 7/16	15 5/16	15 1/4	15 3/8	..
No. 1 Thick Latex Crepe...............	15 1/4	15 7/16	15 5/16	15 1/4	15 3/8	..
No. 1 Brown Crepe.....................	14 1/8	14 5/16	14 3/16	14 1/8	14 1/4	..
No. 2 Brown Crepe.....................	13 15/16	14 1/8	14	13 15/16	14 1/16	..
No. 2 Amber...........................	14 1/8	14 5/16	14 3/16	14 1/8	14 1/4	..
No. 3 Amber...........................	13 15/16	14 1/8	14	13 15/16	14 1/16	..
No. 4 Amber...........................	13 3/8	13 9/16	13 7/16	13 3/8	13 1/2	..
Rolled Brown	11 1/2	11 11/16	11 1/2	11 7/16	11 9/16	..

* Holiday.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	Commodity	City and Country
†4,741	Tires and inner tubes, rubber hose, insulated wire	Tirana, Albania
†4,768	Rubber products, sponge rubber, etc...	Roulers, Belgium
*4,775	Automobile parts	San Juan, Puerto Rico
*4,802	Toys	Zurich, Switzerland
*4,834	Automobile parts	Bogota, Colombia
*4,846	Automobile parts and accessories.....	Cali, Colombia
†4,917	Balata belting scrap	Oran, Algeria
‡4,918	Surgical rubber goods.................	The Hague, Netherlands
*4,922	Toys and novelty goods................	Liege, Belgium
†4,923	Rubber articles and toys..............	Antwerp, Belgium
*4,931	Elastic belts	Stockholm, Sweden

*Agency. †Purchase. ‡Purchase or agency.

1 ribbed smoked sheets follow: December 4, 15½¢; December 11, 15⅜; December 18, 15 1/16; and December 25, 15⅛.

New York Quotations

New York outside market rubber quotations in cents per pound

	Dec. 26, 1936	Nov. 26, 1937	Dec. 29, 1937
Plantations			
Rubber latex...*gal.*	82/83	54½/55	56/57
Paras			
Upriver fine.......	24¾	14¾	14¾
Upriver fine.......	*29½	*20½	*20
Upriver coarse ...	15	9	9
Upriver coarse ...	*22	*14	*15
Islands fine	24¼	14	14
Islands fine	*29	*20	*19
Acre, Bolivian fine	25	15	15
Acre, Bolivian fine	*30	*21	*20½
Beni, Bolivian fine	25¼	15¾	15½
Madeira fine	24¾	14¾	14¾
Caucho			
Upper ball	15	9	9
Upper ball	*22	*14	*15
Lower ball	14½	8	8½
Pontianak			
Pressed block	12/21	14/31	15/31
Guayule			
Duro, washed and dried	16	12½	12½
Ampar	16½	13	13
Africans			
Rio Nuñez	19	15	16
Black Kassai	19½	16	15
Prime Niger flake.	28½	24	26
Gutta Percha			
Gutta Siak	10½	15	13
Gutta Soh	13½	24	18½
Red Macassar	1.00	1.20/1.25	1.20/1.35
Balata			
Block, Ciudad Bolivar	30	..	..
Manaos block	27	27	27
Surinam sheets ..	36	35	35
Amber	39	40	38

*Washed and dried crepe. Shipments from Brazil.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Trafalgar Sq., London, W.C.2, England, gives the following figures for November, 1937:

Rubber Exports: Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham

To	Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex, and Other Forms of Latex Tons
United Kingdom	6,278	442
United States	35,048	497
Continent of Europe ..	10,575	369
British possessions	3,020	70
Japan	1,099	13
Other countries	439	..
Totals	56,459	1,391

Rubber Imports: Actual, by Land and Sea

From	Dry Rubber Tons	Wet Rubber (Dry Weight) Tons
Sumatra	3,999	442
Dutch Borneo	1,038	28
Java and other Dutch islands.	119	..
Sarawak	2,550	..
British Borneo	566	47
Burma	551	13
Siam	2,056	358
French Indo-China	345	114
Other countries	156	14
Totals	11,380	1,016

IMPORTS, CONSUMPTION, AND STOCKS

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Imports* Tons	U. S. Consumption¶ Tons	U. S. Stocks Mfgrs. Importers, Dealers, Etc.† Tons	U. S. Stocks Afloat† Tons	U. K.— Public Warehouses, London, Liverpool†‡ Tons	Singapore and Penang Dealers and Port Stocks†‡ Tons	World Production (Net Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks†‡§ Tons
1935	448,116	491,544	303,000	39,094	164,295	28,304	872,600	939,389	650,494
1936	490,858	575,000	223,000	56,567	78,462	26,969	855,627	1,044,240	464,186
1937									
January ...	32,820	50,818	204,201	55,096	71,062	36,365	71,540	**92,918	422,426
February ..	43,289	51,887	195,080	53,538	63,760	42,132	70,539	93,017	407,807
March	52,039	54,064	191,928	56,994	52,077	42,485	102,428	104,347	445,722
April	35,850	51,797	174,934	72,530	48,748	38,812	89,611	93,486	401,027
May	50,840	51,733	172,985	58,542	46,628	34,234	87,030	101,219	386,403
June	48,956	51,798	169,646	57,215	43,427	45,085	96,111	101,790	414,990
July	39,108	43,650	164,445	75,779	42,175	44,776	112,374	89,705	408,800
August ...	48,785	41,456	171,052	80,439	45,211	47,886	102,683	89,866	417,095
September..	56,049	43,893	182,556	83,288	49,807	49,448	106,921	91,524	457,213
October ...	52,508	38,707	195,685	80,653	51,932	41,965	99,711	81,334	456,676
November .	56,302	33,984	217,586	81,302	......	......	......	......	......

* Including liquid latex. †Stocks on hand the last of the month or year. ‡Statistical Bulletin of the International Rubber Regulation Committee. §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, and afloat. ¶Corrected to 100% from estimate of reported coverage. **Not including additional absorption from U.K. manufacturers' stocks for any month during 1937. The figure will be included in yearly total.

CRUDE rubber consumption by United States manufacturers during November is estimated at 33,984 long tons, against 38,707 long tons during October, a 12.2% decrease and 32.6% under the 50,433 (revised) long tons consumed in November, 1936, according to R.M.A. statistics.

Gross crude rubber imports for November are reported to be 56,302 long tons, an increase of 7.2% over the October figure of 52,508 long tons and 27.1% over the 44,296 long tons imported in November, 1936.

Total domestic stocks of crude rubber on hand November 30 are estimated at 217,586 long tons, compared with October 31 stocks of 195,685 long tons and 211,480 (revised) long tons on hand November 30, 1936.

Crude rubber afloat to United States ports as of November 30 is set at 81,302 long tons, against 80,653 long tons afloat on October 31 and 73,691 long tons which were afloat on November 30, 1936.

London and Liverpool Stocks

Week Ended	Tons London	Tons Liverpool
December 4..........	34,359	21,225
December 11..........	34,326	20,918
December 18..........	34,593	21,072
December 25..........	35,442	21,233

Chile Increases Tire Duties

According to *Commerce Reports* of November 27, 1937, the Chilean decree increasing by one-third the import duties on passenger cars, trucks, automobile chassis, pneumatic tires and tubes, and motor vehicle parts was promulgated in the Chilean Diario Oficial on November 17, 1937, and became effective 45 days thereafter, according to a cablegram of November 17 which was received from the office of the American Commercial Attaché, Santiago.

RUBBER SCRAP

DEMAND for scrap rubber was fair during the past month. Reclaimers have curtailed operations somewhat, and collection of scrap has been very poor.

The market is steadier this month with price reductions being limited chiefly to tire grades, which declined 50¢ to $2 per ton, with the exception of black auto peelings and light gravity solid which remained the same. No. 1 floating inner tubes dropped ½¢ per pound, and No. 1 hard rubber scrap receded ¾¢ per pound. White druggists' sundries are now quoted at 4¼ to 4⅜¢ per pound as compared with 4¼ to 4½¢ per pound, the previous price. Other quotations remained the same as on November 22.

CONSUMERS' BUYING PRICES

(Carload Lots Delivered Eastern Mills)
December 22, 1937

		Prices
Boots and Shoes		
Boots and shoes, black.....	*lb.*	$0.01⅛/$0.01¼
Colored	*lb.*	.00¾/ .00⅞
Untrimmed arctics	*lb.*	.00¾/ .00⅞
Inner Tubes		
No. 1, floating	*lb.*	.10½/ 11
No. 2, compound..........	*lb.*	.04½/ .04¾
Red	*lb.*	.04¼/ 04½
Mixed tubes	*lb.*	.04 / .04¼
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	*ton*	13.50 /14.00
Beadless	*ton*	18.50 /19.00
Auto tire carcass.......	*ton*	19.00 /20.00
Black auto peelings.....	*ton*	24.00 /25.00
Solid		
Clean mixed truck......	*ton*	30.00 /30.50
Light gravity	*ton*	42.00 /43.00
Mechanicals		
Mixed black scrap........	*ton*	22.00 /24.00
Hose, air brake	*ton*	26.00 /28.00
Garden, rubber covered.	*ton*	14.00 /15.00
Steam and water, soft..	*ton*	14.00 /15.00
No. 1 red.................	*lb.*	.03 / .03¼
No. 2 red.................	*lb.*	.02¾/ .03
White druggists' sundries..	*lb.*	.04¼/ .04⅜
Mechanical	*lb.*	.01¾/ .02
Hard Rubber		
No. 1 hard rubber.........	*lb.*	.12¾/ .13¼

COMPOUNDING INGREDIENTS

MARKET conditions continued dull during December, with consumers, as is usual at this period of the year, disinclined to purchase in advance of immediate requirements. With consumer inventories at a low point, producers expect some acceleration in business during the first quarter of 1938. Price structures have, in general, remained steady with declines in some instances.

CARBON BLACK. The price structure which has been unstable since early November is still in an unsettled condition. This abnormal situation is due to conflicting thought as to a differential price for bag and bulk shipments and will probably not continue for long. Prices declined somewhat in December, and in the face of these low prices the demand has fallen off. but is expected to increase again after the first of the year.

FACTICE OR RUBBER SUBSTITUTE. The demand for rubber substitute declined during the past month. A definite improvement in business is expected for 1938. Prices are somewhat easier.

LITHARGE. Two price reductions of ¼¢ per pound each were recorded on December 7 and 16. The schedule for five-ton lots is now 6¾ to 7½¢ per pound, according to delivery point. Prices for smaller than five-ton lots are ½¢ per pound additional.

LITHOPONE. There were no changes in prices during the past month, and manufacturers have been offering contracts for 1938 under the prevailing schedules. Withdrawals against contracts that expire with the end of December have been very light.

RUBBER CHEMICALS. Prices remain unchanged in general, and no change is expected in the near future. Demand has been somewhat low in accordance with decreased activity of most major lines of rubber manufacturing.

RUBBER SOLVENTS. Prices continue at the same levels. The demand from the tire trade has been very light.

STEARIC ACID. Basic material was weaker but the market for stearic acid remained steady. Consumers were inclined to purchase only immediate requirements.

TITANIUM PIGMENTS. Prices continue at previous levels, with no change expected during the first quarter of the new years. Contracts for 1938 have been offered at these prices. Sales to the rubber industry have been very quiet.

ZINC OXIDE. Following the break in white lead, prices of 35 and 50% leaded zinc oxides were reduced at the first of December by ¼¢ and ⅝¢ per pound. Contracts for 1938 have been offered at their new level. The demands of the tire and paint trade have been small, and the principal interest has been in negotiations for 1938 contracts.

New York Quotations

December 27, 1937

Prices Not Reported Will Be Supplied on Application

Abrasives			
Pumicestone, powdered	lb.	$0.03	/$0.035
Rottenstone, domestic	lb.	.03	/ .035
Silica, 15	ton	38.00	
Accelerators, Inorganic			
Lime, hydrated, l.c.l., New York	ton	20.00	
Litharge (commercial)	lb.	.0725/	.0775
Accelerators, Organic			
A-1	lb.	.26	
A-5-10	lb.	.34	
A-10	lb.	.34	
A-11	lb.	.57	
A-19	lb.	.57	
A-32	lb.	.72	
A-77	lb.	.47	
A-100	lb.	.47	
A-433	lb.	.50	
Accelerator 49	lb.	.42	
808	lb.		
833	lb.		
Acrin	lb.		
Aldehyde ammonia	lb.		
Altax	lb.		
B-J-F	lb.		
Beutene	lb.		
Butyl Zimate	lb.		
C-P-B	lb.		
Captax	lb.		
Crylene	lb.		
Paste	lb.		
D-B-A	lb.		
Di-Esterex	lb.		
Di-Esterex-N	lb.		
DOTG	lb.	.47	
D.O.T.T.U.	lb.		
DPG	lb.	.37	
El-Sixty	lb.	.57	
Ethylideneaniline	lb.		
Formaldehyde P.A.C.	lb.		
Formaldehydeaniline	lb.		
Formaldehyde-para-toluidine	lb.		
Guantal	lb.	.40	/ .50
Hepteen	lb.		
Base	lb.		
Hexamethylenetetramine	lb.		
Lead oleate, No. 999	lb.	.13	
Witco	lb.	.15	
Methylenedianilide	lb.		
Monex	lb.		
Novex	lb.		
O. N. V.	lb	.50	/ .55
O-X-A-F	lb.	.50	/ .55
Ovac	lb.		
Pip-Pip	lb.	2.50	
Pipsolene	lb.	1.80	
R-2	lb.	1.70	
Base	lb.	3.65	
R-23	lb.	.57	
R & H 50-D	lb.		
Safex	lb.		
Super-sulphur No. 1	lb.		
No. 2	lb.		
Tetrone A	lb.		
Thiocarbanilide	lb.		
Thionex	lb.		
Trimene	lb.		
Base	lb.		
Triphenyl guanidine (TPG)	lb.		
Tuads	lb.		
Ureka	lb.	$0.65	
Blend B	lb.	.65	
C	lb.	.60	
Vulcanex	lb.		
Vulcanol	lb.		
Vulcone	lb.		
Z-B-X	lb.		
Z-88-P	lb.	.51	
Zenite	lb.		
A	lb.		
B	lb.		
Zimate	lb.		
ZML	lb.		
Activator			
Barak	lb.		
Age Resisters			
AgeRite Alba	lb.		
Exel	lb.		
Gel	lb.		
Hipar	lb.		
HP	lb.		
Powder	lb.		
Resin	lb.		
D	lb.		
Syrup	lb.		
White	lb.		
Akroflex C	lb.		
Albasan	lb.		
Antox	lb.		
B-L-E	lb.		
B-X-A	lb.		
Copper Inhibitor X-872	lb.		
Flectol B	lb.	.54	
H	lb.	.54	
White	lb.	1.00	
M-U-F	lb.		
Neozone (standard)	lb.		
A	lb.		
C	lb.		
D	lb.		
E	lb.		
Oxynone	lb.	.68	
Parazone	lb.		
Perflectol	lb.	.67	
Permalux	lb.		
Santoflex A	lb.		
B	lb.	.54	
Solux	lb.		
Thermoflex	lb.		
A	lb.		
V-G-B	lb.		
Alkalies			
Caustic soda, flake, Columbia (400 lb. drums)	100 lbs.	$2.70	/$4.35
liquid, 50%	100 lbs.	1.95	
solid (700 lb. drums)	100 lbs.	2.30	/ 3.95
Antiscorch Materials			
A-F-B	lb.		
Antiscorch T	lb.		
Cumar RH	lb.	.09	
R-17 Resin (drums)	lb.	.10	
Retarder B	lb.		
W	lb.		
T-J-B	lb.		
U.T.B.	lb.		
Antisun Materials			
Heliozone	lb.		
Sunproof	lb.		
Brake Lining Saturant			
B. R. T. No. 3	lb.	.0165/	.0175
Colors			
BLACK			
Lampblack (commercial)	lb.	.15	
BLUE			
Brilliant	lb.		
Prussian	lb.	.0375	
Toners	lb.	.08	/ 3.85
BROWN			
Mapico	lb.	.13	
GREEN			
Brilliant	lb.		
Chrome, light	lb.		
medium	lb.		
oxide (freight allowed)	lb.	.22	
Dark	lb.		
Guignet's, Easton, Pa., bbls.	lb.	.70	
Light	lb.		
Toners	lb.	.85	/ 3.75
ORANGE			
Lake	lb.		
Toners	lb.	.40	/ 1.60
ORCHID			
Toners	lb.	1.50	/ 2.00
PINK			
Toners	lb.	1.50	/ 4.15
PURPLE			
Permanent	lb.		
Toners	lb.	.60	/ 2.10

RED

Antimony
- Crimson, 15/17% ....*lb.* $0.45
- R. M. P. No. 3 ....*lb.* .48
- Sulphur free ....*lb.* .50
- R.M.P. ....*lb.* .52
- Golden 15/17% ....*lb.* .28
- 7-A ....*lb.* .37
- Z-2 ....*lb.* .23

Aristi ....*lb.* 1.75
Cadmium, light (400 lb. bbls.) ....*lb.* .76 /$0.81
Chinese ....*lb.*
Crimson ....*lb.*
Mapico ....*lb.* .0925
Medium ....*lb.*
Rub-Er-Red, Easton, Pa., bbls. ....*lb.* .0925
Scarlet ....*lb.*
Toners ....*lb.* .08 / 2.00

WHITE

Lithopone (bags) ....*lb.* .04⅜ / .04⅝
- Albalith Black Label-11 ..*lb.* .04⅜ / .04⅝
- Astrolith ....*lb.* .04⅜ / .04⅝
- Azolith ....*lb.* .04⅜ / .04⅝
- Cryptone-19 ....*lb.* .05⅞ / .06⅛
- CB-21 ....*lb.* .05⅞ / .06⅛
- ZS No. 20 ....*lb.* .09 / .0925
- No. 86 ....*lb.* .09 / .0925
- Sunolith ....*lb.* .04⅜ / .04⅝

Ray-Bar ....*lb.*
Ray-Cal ....*lb.*
Rayox ....*lb.*
Titanolith (5-ton lots) .....*lb.* .05⅞ / .06⅛
Titanox-A (50-lb. bags) ....*lb.* .16 / .1675
- B (50-lb. bags) ....*lb.* .05⅞ / .06⅛
- B-30 (50-lb. bags) ....*lb.* .05⅞ / .06⅛
- C (50-lb. bags) ....*lb.* .05⅞ / .06⅛

Ti-Tone ....*lb.*
Zinc Oxide
- Anaconda, Green Seal
  - No. 333 ....*lb.* .08 / .085
  - Lead Free No. 352 ....*lb.* .075 / .08
  - No. 570 ....*lb.* .075 / .08
  - No. 577 ....*lb.* .075 / .08
  - Red Seal No. 222 .....*lb.* .075 / .08
  - U.S.P. No. 777 (bbls.) .*lb.* .095 / .0975
  - White Seal No. 555 ...*lb.* .085 / .09
- Azo ZZZ-11 ....*lb.* .0625/ .065
  - 44 ....*lb.* .0625/ .065
  - 55 ....*lb.* .0625/ .065
  - 66 ....*lb.* .0625/ .065
- French Process, Florence
  - White Seal-7 (bbls.) ...*lb.* .085 / .0875
  - Green Seal-8 ....*lb.* .08 / .0825
  - Red Seal-9 ....*lb.* .075 / .0775
- Kadox, Black Label-15 ...*lb.* .065 / .0675
  - Red Label-17 ....*lb.* .065 / .0675
  - No. 25 ....*lb.* .075 / .0775
- Horse Head Special 3 ....*lb.* .0625/ .065
  - XX Red-4 ....*lb.* .0625/ .065
  - 23 ....*lb.* .0625/ .065
  - 72 ....*lb.* .0625/ .065
  - 78 ....*lb.* .0625/ .065
  - 80 ....*lb.* .0625/ .065
  - 103 ....*lb.* .0625/ .065
  - 110 ....*lb.* .0625/ .065
- St. Joe (lead free)
  - Black Label ....*lb.* .0625/ .065
  - Green Label ....*lb.* .0625/ .065
  - Red Label ....*lb.* .0625/ .065

U.S.P. ....*lb.* .095 / .0975
White Jack ....*lb.* .09 / .0925
Zopaque ....*lb.*

YELLOW

Cadmolith (cadmium yellow), 400 lb. bbls. ....*lb.* .51 / .56
Lemon ....*lb.*
Mapico ....*lb.* .095
Toners ....*lb.* 2.50

Dispersing Agents

Bardol ....*lb.* .0215/ .024
Darvan ....*lb.*
Nevoll (drums) ....*lb.* .0215
Santomerse ....*lb.* .13

Fillers, Inert

Asbestine, c.l., f.o.b. mills.*ton* 15.00
Barytes ....*ton* 30.00 /36.00
- f.o.b. St. Louis (50 lb. paper bags) ....*ton* 22.85

Barytes, off color, domestic.*ton* 20.00 /25.00
- white, imported ....*ton* 29.00 /32.00

Blanc fixe, dry, precip... *lb.* .035 / .05
Calcene ....*ton* 37.50 /45.00
Infusorial earth ....*lb.* .02 / .03
Kalite No. 1 ....*ton*
- No. 3 ....*ton*

Magnesia, calcined, heavy..*lb.* .04
- Carbonate L.C.L. ....*lb.* .065 / .09

Pyrax ....*ton*
Whiting
- Columbia Filler ....*ton* 9.00 /14.00
- Domestic ....100 *lbs.*
- Guilders ....100 *lbs.*
- Hakuenka ....*lb.*
- Paris white, English cliffstone ....100 *lbs.*
- Southwark Brand, Commercial ....100 *lbs.*
  - All other grades...100 *lbs.*

Suprex, white extra light.*ton* $45.00 /$60.00
- heavy ....*ton* 45.40 /60.00

Witco, c.l. ....*ton* 7.00

Fillers for Pliability

P-33 ....*lb.*
Thermax ....*lb.*
Velvetex ....*lb.* .03 / .045

Finishes

IVCO lacquer, clear......*gal.* 1.55 / 2.55
- colors ....*gal.* 2.60 / 3.25

Rubber lacquer, clear.....*gal.*
- colored ....*gal.*

Starch, corn, pwd.....100 *lbs.*
- potato ....*lb.*

Talc ....*ton* 25.00 /45.00

Flock

Cotton flock, dark ....*lb.* .12 / .13
- dyed ....*lb.* .15 / .85
- white ....*lb.* .145 / .20

Rayon flock, colored.......*lb.* 1.25 / 2.00
- white ....*lb.* 1.00 / 1.25

Latex Compounding Ingredients

Accelerator 85 ....*lb.*
- 89 ....*lb.*
- 122 ....*lb.*
- 552 ....*lb.*

Aerosol ....*lb.* .45
Antox, Dispersed ....*lb.*
Aquarex A ....*lb.*
- D ....*lb.*
- F ....*lb.*

Areskap No. 50 ....*lb.* .20
- No. 100, dry ....*lb.* .43

Aresket No. 240 ....*lb.* .18
- No. 250, alcoholic ....*lb.* .22
- No. 300, dry ....*lb.* .46

Aresklene No. 375 ....*lb.* .40
- No. 400, dry ....*lb.* .56

Black No. 25, Dispersed ...*lb.* .22 / .40
Catalpo ....*ton*
Color Pastes, Dispersed ....*lb.*
Dispersex No. 15 ....*lb.* .11 / .12
- No. 20 ....*lb.* .08 / .10

Emo, brown ....*lb.* .15
- white ....*lb.* .15

Factice Compound, Dispersed ....*lb.* .35
Heliozone, Dispersed ....*lb.*
Igepon A ....*lb.*
MICRONEX, Colloidal.....*lb.* .06 / .07
Nekal BX (dry) ....*lb.*
Palmol ....*lb.* .10
Paradors ....*lb.*
R-23 ....*lb.* .57
S.1 (400 lb. drums) ....*lb.* .65
Santomerse ....*lb.* .13
Stablex A ....*lb.* .90 / 1.10
- B ....*lb.* .65 / .90
- C ....*lb.* .40 / .50

Sulphur, Dispersed ....*lb.* .10 / .15
- No. 2 ....*lb.*

T.1. (400 lb. drums) ....*lb.* .40
Tepidone ....*lb.*
Vulcan Colors ....*lb.*
Zinc oxide, Colloidal ......*lb.*
- Dispersed ....*lb.* .12 / .15

Mineral Rubber

B. R. C. No. 20 ....*lb.* .009 / .01
Black Diamond ....*ton* 25.00
Genasco Hydrocarbon, granulated, (fact'y)...*ton*
- solid ....*ton*

Gilsonite Hydrocarbon (factory) ....*ton*
Hydrocarbon, hard ....*ton*
- soft ....*ton*

Parmr Grade 1 ....*ton* 25.00 /27.00
- Grade 2 ....*ton* 25.00 /27.00

Pioneer ....*ton*
265° ....*ton*

Mold Lubricants

Lubrex ....*lb.* .25 / .30
Mold Paste ....*lb.* .18
Sericite ....*ton* 65.00 /75.00
Soapbark ....*lb.*
Soapstone ....*ton* 25.00 /35.00

Oil Resistant

AXF ....*lb.*

Reclaiming Oils

B. R. V. ....*lb.* .03 / .0325
S. R. O. ....*lb.* .0175/ .0185

Reenforcers

Carbon Black
- Aerfloted Arrow Specification Black ....*lb.*
- Arrow Compact Granulized Carbon Black ....*lb.*
- "Certified" Heavy Compressed, Cabot ....*lb.*
  - Spheron ....*lb.*
- Continental Dustless .....*lb.* .0345/ .0435
  - Compressed c.l. ....*lb.* .0345/ .0435
  - Uncompressed, c.l. ....*lb.* .0345/ .0435
- Disperso, c.l. ....*lb.* .0345/ .0435
- Dixie, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ...*lb.* $0.032
  - c.l., delivered New York.*lb.* .041
  - local stock, bags, delivered ....*lb.* .07
- Dixiedensed, c.l., f.o.b., New Orleans, La., Galveston or Houston, Tex.....*lb.* .032
  - c.l., delivered New York.*lb.* .041
  - local stock, bags, delivered ....*lb.* .07
- Dixiedensed 66, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ....*lb.* .032
  - c.l., delivered New York.*lb.* .041
  - local stock, bags, delivered ....*lb.* .07
- Excello, c.l., f.o.b. Gulf ports ....*lb* .0445/ .0645
  - delivered New York.*lb.* .0505/ .0705
  - l.c.l., delivered New York ....*lb.* .07 / .09
- Fumonex, c.l., f.o.b. works.*lb.* .03
  - ex-warehouse ....*lb.* .045
- Gastex ....*lb.* .03 / .07
- Kosmobile, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ...*lb.* .032
  - c.l., delivered New York.*lb.* .041
  - local stock, bags, delivered ....*lb.* .07
- Kosmobile 66, c.l., f.o.b New Orleans, La., Galveston or Houston, Tex. ....*lb.* .032
  - c.l., delivered New York.*lb.* .041
  - local stock, bags, delivered ....*lb.* .07
- Kosmos, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.....*lb.* .032
  - c.l., delivered New York.*lb.* .041
  - local stock, bags, delivered ....*lb.* .07
- MICRONEX Beads, c.l., f.o.b. Gulf ports...*lb.* .0345
  - c.l., delivered New York ....*lb.* .0435
  - local, stock, bags, delivered ....*lb.* .07
- Mark II, c.l., f.o.b. Gulf ports ....*lb.* .0345
  - c.l., delivered New York ....*lb.* .0435
  - local, stock, bags, delivered ....*lb.* .07
- Standard, c.l., f.o.b. Gulf ports ....*lb.* .0345
  - c.l., delivered New York ....*lb.* .0435
  - local, stock, bags, delivered ....*lb.* .07
- W-5, c.l., f.o.b., Gulf ports ....*lb.* .0345
  - c.l., delivered New York ....*lb.* .0435
  - local, stock, bags, delivered ....*lb.* .07
- W-6, c.l., f.o.b., Gulf ports ....*lb.* .0345
  - c.l., delivered New York ....*lb.* .0435
  - local, stock, bags, delivered ....*lb.* .07
- Paradene No. 2 (drums) .*lb.* .04
- Pelletex ....*lb.* .03 / .07
- Supreme, c.l., f.o.b. Gulf ports ....*lb.* .0445/ .0645
  - delivered New York...*lb.* .0505/ .0705
  - l.c.l. delivered New York ....*lb.* .07 / .09
- "WYEX BLACK" ......*lb.*

Carbonex ....*lb.* .029 / .0315
Carbonex "S" ....*lb.* .0315/ .034
Clays
- Aerfloted Paragon (50 lb. bags) ....*ton* 9.50 /22.00
  - Suprex (50 lb. bags)..*ton* 9.50 /22.00
- China ....*ton* 17.50 /20.00
- Dixie ....*ton*
  - Junior ....*ton*
- McNamee ....*ton*
- Par ....*ton*
- Witco, f.o.b. Works......*ton* 9.00

Cumar EX ....*lb.* .035

Reodorants

Amora A ....*lb.*
- B ....*lb.*
- C ....*lb.*
- D ....*lb.*

Curodex 19 ....*lb.* 2.75
- 188 ....*lb.* 3.50
- 198 ....*lb.* 4.50

Paradors ....*lb.*
Rodo No. 0 ....*lb.*
- No. 10 ....*lb.*

Rubber Substitutes

Black ....*lb.* .0775/ .135
Brown ....*lb.* .085 / .14
White ....*lb.* .095 / .1525

(*Continued on page 96*)

COTTON AND FABRICS

New York Cotton Exchange Week-End Closing Prices

Futures	Oct. 30	Nov. 27	Dec. 4	Dec. 11	Dec. 18	Dec. 25
Nov. ...	8.05	....	....	....	....	....
Dec. ...	8.04	8.07	7.84	7.99	....	....
Jan. ...	....	8.10	7.87	7.99	8.12	8.20
Mar. ...	8.00	8.17	7.91	8.07	8.22	8.33
July ...	7.99	8.22	8.00	8.12	8.33	8.44
Sept. ...	8.07	8.24	8.02	8.16	8.39	8.48
Oct. ...	8.10	8.26	8.04	8.18	8.42	8.50

New York Quotations

December 27, 1937

Drills	
38-inch 2.00-yard ....yd.	$0.11
40-inch 3.47-yard	.06⅞
50-inch 1.52-yard	.15¼
52-inch 1.85-yard	.12¾
52-inch 1.90-yard	.12⅜
52-inch 2.20-yard	.11¼
52-inch 2.50-yard	.10½
59-inch 1.85-yard	.13
Ducks	
38-inch 2.00-yard D. F. ....yd.	.11
40-inch 1.45-yard S. F............	.16¼
51½-inch 1.35-yard D. F.........	.16¼
72-inch 1.05-yard D. F...........	.23
72-inch 17.21-ounce	.25¾
Mechanicals	
Hose and belting...........lb.	.24½
Tennis	
52-inch 1.35-yard ....yd.	.17¼
Hollands	
Gold Seal and Eagle	
20-inch No. 72 ....yd.	.09½
30-inch No. 72	.17
40-inch No. 72	.19
Red Seal and Cardinal	
20-inch ....yd.	.08
30-inch	.14¾
40-inch	.16
50-inch	.24
Osnaburgs	
40-inch 2.34-yard ....yd.	.09⅝
40-inch 2.48-yard	.09¼
40-inch 2.56-yard	.08⅛
40-inch 3.00-yard	.07⅔
40-inch 7-ounce part waste......	.07
40-inch 10-ounce part waste	.10
37-inch 2.42-yard	.09½
Raincoat Fabrics	
Cotton	
Bombazine 60 x 64.........yd.	.07½
Plaids 60 x 48................	.10¾
Surface prints 60 x 64........	.11¾
Print cloth, 38½-inch, 60 x 64.	.04⅝
Sheetings—40-Inch	
48 x 48, 2.50-yard.........yd.	.07¾
64 x 68, 3.15-yard............	.07¼
56 x 60, 3.60-yard............	.06¼
44 x 40, 4.25-yard............	.04⅞
Sheetings, 36-Inch	
48 x 48, 5.00-yard.........yd.	.04¼
44 x 40, 6.15-yard	.03¼
Tire Fabrics	
Builder	
17¼ ounce 60" 23/11 ply Karded peeler ....lb.	.29½
Chafer	
14 ounce 60" 20/8 ply Karded peeler ....lb.	.29½
9¼ ounce 60" 10/2 ply Karded peeler ....lb.	.28½
Cord Fabrics	
23/5/3 Karded peeler, 1 1/16" cotton ....lb.	.30½
15/3/3 Karded peeler, 1 1/16" cotton ....lb.	.28½
23/5/3 Karded peeler, 1¼" cotton ....lb.	.36
23/5/3 Combed Egyptian...lb.	.49½
Lene Breaker	
8¼ ounce and 10¼ ounce 60" Karded peeler ....lb.	.31½

The accompanying table of week-end closing prices on the New York Cotton Exchange shows the week-end change of representative futures covering the past two months.

The New York spot middling price closed at 7.90¢ per pound on November 22. Thereafter, the trend was generally upward and the price closed at 8.51¢ on December 21, the highest since October 21. After this the price receded and closed at 8.38¢ a pound December 31. A total gain of 0.19¢ was registered for December 20 and 21, influenced by active foreign buying and improved domestic demand. On December 8 the Government Crop Reporting Board estimated this year's production of cotton at 18,746,000 bales as of December 1, an increase of 503,000 bales over its figure of November 1. The indicated crop is the largest in the nation's history, comparing with 17,978,000 bales grown in the previous record year, 1926.

Sales at 13 southern markets totaled 447,994 bales during 23 days since November 20, as compared with 522,680 bales for the same days in 1936. Trading was moderate during the latter part of November and the first days of December, but became more active at the middle of month.

Government action on the cotton control plan has been deferred until Congress meets in January, the farm bill being in committee for adjustment at present.

Consumption of all cotton in domestic mills during November totaled 484,819 bales, against 526,464 in October and 625,794 in November a year ago, according to a report of the Census Bureau.

Fabrics

The tone of the cloth market improved somewhat over a month ago. Volume of cloth buying, however, has not been sufficient as yet to lift selling prices which are still below raw cotton parity. In general, mills were closed during the last half of December. The market is expected to improve during the early part of 1938, and the belief is prevalent that the current price structure is at the lowest level to be reached for some time to come.

Tire fabric prices remain steady; while other fabric prices reflect a somewhat easier trend.

EAST AND SOUTH

(*Continued from page 67*)

A. G. Spalding & Bros., manufacturer of athletic equipment and sport clothing, 105 Nassau St., New York, N. Y., on November 23 held a meeting of the board of directors at which the resignation, effective November 30, of H. Boardman Spalding as vice president and secretary was accepted. Treasurer C. S. Lincoln was then named secretary. Herbert H. Pease was elected a director to fill the unexpired term of E. E. Combs, comptroller of the company, whose resignation as a director was also presented and accepted. Mr. Spalding stated that although his principal duty with the company had been as general counsel, he wished to resume a more general practice of law and on December 1 became a partner of Lewis & Kelsey, 120 Broadway, New York, which firm has been retained as general counsel of the company. He further declared that his resignation does not imply any change in the large financial interest he has in the Spalding concern, of which he will remain a director.

The Society of Chemical Industry on January 7 at a joint meeting of its American Section and the American Chemical Society will make its annual award of the Perkin Medal to Dr. Frank J. Tone, president, Carborundum Co., Niagara Falls, N. Y. James G. Vail, president, American Section, S. C. I., will preside at the meeting at 8:00 p. m., The Chemists' Club, 52 E. 41st St., New York, N. Y., where a dinner will take place at 6:15 p. m. honoring the Perkin medalist.

The Freeport Sulphur Co., 122 E. 42nd St., New York, N. Y., according to President L. M. Williams, Jr., produced 1,100,000 tons of elemental sulphur at Grand Ecaille, La., in the swampy delta, since production began four years ago. The company decreased its output in Louisiana 17 months ago when the state severance tax was increased from 60¢ to $2 a ton, but production was restored on the assurance of state officials that the tax will be adjusted downward to conform with the levy of $1.03 a ton made by Texas, Mr. Williams reported.

Overseas Automotive Club, Inc., on December 15 announced the results of an election of officers by mail balloting, as follows: president, J. F. Kelly, Jr., export manager, Electric Storage Battery Co., 25 W. 43rd St., New York, N. Y.; first vice president, H. G. Farwell, export manager, Raybestos-Manhattan, Inc., Bridgeport, Conn.; second vice president, Edward L. Caswell, export manager, Thompson Products, Inc., Cleveland, O.; treasurer, Clement Pueschel, export manager, 1841 Broadway, New York; and secretary, George E. Quisenberry, editor of the overseas edition, *The American Automobile,* 330 W. 42nd St., New York.

Hohwieler Rubber Co., Morrisville, Pa., has reduced working hours instead of laying off help. The company has many small orders on hand, but the big business has declined. The company is producing novelties for mail-order houses.

Editor's Book Table

BOOK REVIEWS

"Latex and Rubber Derivatives and Their Industrial Applications." Volumes II and III. Frederick Marchionna. *The Rubber Age*, 250 W. 57th St., New York, N. Y., 1937. Cloth, 1670 pages, 6 by 9 inches. Comprehensively indexed. Price: Volumes II and III, $20 (Not sold separately).

Volumes II and III, supplementing Volume I, 1933, extend the scope of this valuable reference work on latex to include rubber derivatives. The present work with 2,932 items on latex which appears four years after the publication of the first volume, which included 2,500 latex items, is a bibliographical reference compilation of patents and published literature on latex from June, 1932, to January, 1937. The section on rubber derivatives goes back to the earliest patents and literature. Also, the explanatory introductions which supplement the patent and literature abstracts have been amplified and include contributions by some of the foremost men in these fields.

The material is divided into two parts, Part 1 on latex and Part 2 on rubber derivatives. Each section is classified by separation into appropriate chapters, and each chapter is introduced by a short, but comprehensive article. The chapter introduction is followed by abstracts of the related patent and technical literature, both foreign and domestic. All abstracts are numbered consecutively throughout the two volumes for easy reference.

The chapter headings for the section on latex are: (1) Latex and Its Properties, (2) Conditioning of Latex, (3) Vulcanized Latex and Vulcanization Process, (4) Compounding and Compounded Latex, (5) Depositing Latex Processes and Dipped Articles, (6) Rubber Threads and Filaments Manufacture, (7) Textile Fabric Manufacture, (8) Paper and Artificial Leather Manufacture, (9) Coating and Impregnation-Generic, (10) Electrical Insulation, (11) Porous Rubber Products, (12) Floor and Road Coverings, (13) Shoe Manufacture, (14) Rubber Powders, (15) Miscellaneous Processes and Products, (16) Artificial Latex and Mixed Dispersions, (17) Electrodeposition of Rubber.

Part 2 on rubber derivatives opens with an introductory article by H. L. Fisher, "The Composition and Structure of the Rubber Hydrocarbon," and contains 941 items grouped into chapters on the following topics: (1) Oxidized Rubber, (2) Hydrogenated Rubber, (3) Halogenated Rubber Products, (4) Cyclized Rubber, (5) Condensation Products of Rubber. The compilation has four indices: (1) Author, (2) Patentees, (3) Patents, and (4) Subject.

This valuable compendium of information affords a ready source of reference for those connected with research or development in these two important and rapidly growing fields. It should be pointed out that the abstracts which represent untiring and efficient labor on the part of the author are of a comprehensive and meritorious character.

"How to Handle Grievances." Glenn Gardiner. Elliott Service Co., 219 E. 44th St., New York, N. Y. 1937. 5½ by 7¾ inches, 52 pages. Price: leatherette, 60¢; paper, 45¢. Discount on large quantities.

Since the validation of the National Labor Relations Act employers have been confronted with the urgency of dealing with employe grievances in an intelligent and effective manner. This book, written in a convenient manual form, has been designed as an aid to those who are earnestly striving to make industry a place in which fair play, mutual understanding, and harmonious relations prevail. Written as a guide for all persons in supervisory authority, both in industry and business, this book presents the fundamental principles which have been found to be effective in the handling of complaints. The introductory chapter gives a partial list of 32 common grievances. The author then deals briefly with the important principles involved in the contact with employes. A set of rules, each a direct and forceful statement, is given for each principle set forth. Throughout the book provision has been made for the reader to insert notes to supplement the text. If those who give orders and supervise work would consistently practice the principles laid down in this book, a definite betterment of industrial relations should be achieved.

"The Retardation of Chemical Reactions." Kenneth C. Bailey. Longmans, Green & Co., 114 Fifth Ave., New York, N. Y. Cloth, 479 pages, 5⅞ by 9 inches. Index. Price $8.

It is true, as the author points out in the preface of this book, that the chemist is usually more concerned with the promotion of chemical reactions than with their retardation. However there are a number of reactions, notably oxidation, which occur to the detriment of the product involved, and the inhibition or retardation of these reactions is of paramount importance. This fact is well known in the rubber industry; and while the rubber chemist has had the task of accelerating the reaction of vulcanization, he has also been confronted with the difficult problem of retarding the oxidation of rubber.

Although much has been published on particular types of chemical retardation, this book represents the first comprehesive survey of the subject and includes a complete bibliography. In form, the book critically reviews the periodical and patent literature, thus providing the research worker with a summary of each phase of the subject. An indication of the extensive nature of this work is given by the 1,630 bibliographical listings, covering 85 pages at the end of the volume.

The book contains a chapter on "Protection of Rubber," which deals with the rubber oxidation problem from both a theoretical and practical standpoint.

In regard to antioxidants, the author states, "while the amount of work done on the discovery of substances with stabilizing properties is enormous, relatively little has been done on the theory of rubber protection."

In addition to the rubber aging problem the retardation of vulcanization in connection with the use of ultra-accelerators is briefly discussed. While this chapter is the only one devoted exclusively to rubber and covers but 10 pages, there is much of interest to the rubber chemist in the other sections of the book. In the chapter on "Polymeric and Isomeric Changes" the author discusses problems pertaining to the polymerization of chloroprene, butadiene, and isoprene. The book also devotes a large amount of space to the various theories of retardation including the anti-oxygen theory of Moureu and Dufraisse.

"Cotton Production and Distribution." United States Department of Commerce, Washington, D. C. 54 pages. Bulletin 174 presents statistics for the season of 1936-37 on: supply and distribution of cotton and linters in the United States, cotton production in the United States, consumption and stocks of cotton, imports and exports of cotton, world's production and consumption of cotton, and cottonseed and cottonseed products. Copies at 10¢ each may be obtained from the United States Government Printing Office, Washington, D. C.

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CHEMIST, AGE 31, WITH 8 YEARS' LATEX EXPERIENCE, development and control laboratory, factory management, technical sales, thorough knowledge latex compounding and uses, desires position of responsibility, latex research preferred. Now employed. Good references. Will go anywhere in States. Address Box No. 912, care of INDIA RUBBER WORLD.

SUPERINTENDENT AND CHEMIST, NOW EMPLOYED, FOR personal reason wishes change to new organization. Twenty-five years' experience in all classes of mechanical rubber manufacture. Thoroughly familiar with specification work, laboratory and factory control. Address Box No. 913, care of INDIA RUBBER WORLD.

HOSE DEPARTMENT FOREMAN, AGE 43, PRACTICAL MAN with 13 years' experience in all types of wrapped or molded hose. Can handle labor and produce results. Address Box No. 914, care of INDIA RUBBER WORLD.

SUPERINTENDENT, NOW EMPLOYED, DESIRES CHANGE. Eighteen years' experience in manufacturing mechanical rubber goods, sponge rubber and synthetic rubber products. Age thirty-nine. Can draw up manufacturing specifications, make estimates, develop new products and compound for sponge rubber, synthetic, or ordinary rubber goods. University education in chemical and mechanical engineering. Can organize and handle labor efficiently. Address Box No. 916, care of INDIA RUBBER WORLD.

SITUATION OPEN

WANTED: A SALESMAN TO HANDLE MOLDED HARD RUBBER products as a side line. Address Box No. 911, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

THE PROPRIETORS OF U. S. A. PATENT NO. 2,051,940 RELATING to rubber buckets are prepared to either grant licenses for manufacture and sale of this article or would be prepared to sell the rights for a reasonable amount. Address inquiries to: H. G. Miles, Ltd., Works Road, Letchworth, Hertfordshire, England.

PARTNER, HONEST, WITH $3,000 to $5,000 TO OPERATE NEW small rubber plant, liquid latex products and molded rubber goods. Sales and profits assured. Address Box No. 917, care of INDIA RUBBER WORLD.

(*Advertisements continued on page 93*)

NEW PUBLICATIONS

"Aromatic Products." Catalog No. 10. Givaudan-Delawanna, Inc., 80 Fifth Ave., New York, N. Y. 40 pages. This catalog contains a complete listing of the various aromatic and special materials manufactured by the Givaudan organization. While current prices of the listed products are given, the purpose of this booklet is essentially for use as a reference source. A short descriptive notation accompanies the greater part of the listings. In the concluding pages are brief discussions on the odor problems confronted by the paint, printers ink, rubber, and textile industries. The use of deodorants in the rubber industry is summarized by specifically mentioning the type of products in which treatment for odor is desirable. Newer developments, it is pointed out, include deodorants for goods cured with sulphur chloride as well as softeners that combine an agreeable odor with excellent softening properties. Also materials which improve the odor of synthetic rubber compounds are now being offered as well as special deodorants for latices which by test have been found to be compatible with latex, completely soluble, and cause no discoloration or coagulation.

"Bristol's Modern Electric Recorders." Bulletin No. 496. The Bristol Co., Waterbury, Conn. The various improvements made in Bristol's recording voltmeters and ammeters are outlined in this new bulletin. Sample chart records and photographs of the new instrument models, showing the operating mechanism, are included in the bulletin. Facts are also given regarding the usefulness and the various applications of these instruments in such industries as: public utilities, chemical, ceramics, rubber, plastics, paper, and food.

"Neville Coal-Tar Products." The Neville Co., Pittsburgh, Pa. Four pages. This comprehensive folder contains a condensed and complete listing of Neville coal-tar products with their uses and other pertinent data. The products are divided into five groups: synthetic resins, solvents, plasticizing oils, tar products, and oils. This classification indicates several items having a function in rubber compounding. On Page 2 is a graphic derivation chart depicting the various by-products of coal and their uses.

"Tag Industrial Thermometers." C. J. Tagliabue Mfg. Co., Park and Nostrand Aves., Brooklyn, N. Y. 24 pages. This catalog contains a complete listing of Tag industrial thermometers including miscellaneous metal and woodback thermometers, hygrometers, U-gages, mercurial vacuum gages, and mercurial barometers.

"Rex-Weld and Rex-Tube Insulated Steam Hose." Chicago Metal Hose Corp., Maywood, Ill. Four pages. Seven types of Rex-Tube and Rex-Weld steam hose are illustrated in this leaflet. Each illustration shows the detailed construction of the insulated and reenforced hose which conforms to U. S. Navy specifications. Rex-Tube is of interlocking design; while Rex-Weld is of one-piece, jointless construction of balanced strength.

"Carbon Black for Industry." Catalog 237. Imperial Oil & Gas Products Co., Pittsburgh, Pa. 32 pages. After outlining the history and the development of the carbon black industry, particularly as they relate to the growth of the Imperial Gas & Oil Products Co., this informative illustrated booklet details the properties and uses of the many different grades of Imperial carbon blacks. The paint, rubber, and ink industries are each taken up separately. According to this booklet a satisfactory carbon black for rubber manufacture must: (1) possess maximum reenforcing properties; (2) have the proper rate of cure to fit the user's compounding practice; (3) possess good aging properties; (4) disperse easily and produce a workable stock; (5) be free from grit; and (6) be uniform. Each one of these essentials is discussed with relation to Supreme carbon black, Imperial's rubber black. In addition to the use in those industries mentioned, a list of other applications is given with specific recommendations for the type of Imperial black suitable in each case.

"News about du Pont Rubber Chemicals." E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. A monthly news letter, dated December 6, 1937, pointed out that, through recent plant enlargement, the production of Neoprene has been doubled. Included with the letter were three enclosures:

(1) "Neoprene Type H." Two pages. This report describes a new type of Neoprene (Type H) which is recommended for applications where elevated temperatures prevail and states that comparative tests have shown the Type H to be definitely superior to Type E under such conditions.

(2) "Neoprene Type M." One page. This brief report announces Type M Neoprene, developed chiefly for applications where refrigerants, petroleum solvents, range oil, etc., are present and where extractable matter must be kept at a minimum. Also, light colored compounds made with Type M discolor less on exposure to light than when other types are used.

(3) "Influence of Metallic Oxides on Neoprene Properties." H. W. Starkweather and H. W. Walker. 18 pages. This enclosure, a reprint of an article in Industrial and Engineering Chemistry, August, 1937, discusses the influence of metallic oxides on the stability of uncured Neoprene and on the stress-strain properties, hardness, and water absorption of cured Neoprene.

"A.S.T.M. Standards on Electrical Insulating Materials." 1937 Edition. American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. 373 pages. This edition, prepared by Committee D-9 on Electrical Insulating Materials, includes all of the 37 A.S.T.M. specifications and test methods covering the various types of insulating materials. These standards, presented in their latest approved form, are grouped in the following manner: insulating varnishes, paints, lacquers, etc.; molded insulating materials; plates, tubes, and rods; mineral oils; ceramic products (porcelain, glass); solid filling and treating compounds; electrical tests; papers and fabrics; mica products; rubber products and textile materials. Also included are two proposed standards covering tests for neutralization number of petroleum products and specifications for rubber blankets. Besides the standards this edition presents three interesting discussions on the significance of tests involving dielectric strength, resistivity, and impact. These discussions have been prepared by three prominent technologists. Copies of this publication can be obtained from A.S.T.M. headquarters at $2 per copy.

"A.S.T.M. Standards on Rubber Products." 1937 Edition. American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. 238 pages. This publication, sponsored by Committee D-11 on Rubber Products, presents in convenient form for laboratory use and reference all of the 25 standards issued by the A.S.T.M. in this field. There are 15 methods of testing procedure and nine specifications with a proposed specification for rubber insulating blankets. Among the various types of tests covered are tension, hardness, abrasion resistance, flexing, compression set, accelerated aging, and chemical analysis. Detailed tests cover wire and cable, rubber hose, and rubber belting. Specification requirements cover fire hose, rubber pump valves, friction tape, rubber insulating tape, various classes of insulated wire and cable, gloves for electrical workers, etc. In addition to standards a bibliography is included which gives sources of information concerning properties and testing of rubber and rubber products. This includes references which are comprehensive and lists the more important of the recent publications. Copies of this publication can be obtained from A.S.T.M. headquarters at $1.25 per copy.

(Continued on page 94)

Classified Advertisements

Continued

MACHINERY AND SUPPLIES FOR SALE

FOR SALE: COMPLETE LINE OF USED RUBBER EQUIPMENT including mills, calenders, hydraulic presses, vulcanizers, Banbury mixers, driers, etc. Send for complete list. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York, N. Y.

MACHINERY AND SUPPLIES WANTED

WANTED: FOR OUR EXPANSION PROGRAM, GOOD USED equipment including Experimental Machines, Large Size Mills and Calenders, Tubers, Hydraulic Presses and a Banbury Mixer, etc. Advise us of your offerings. Address Box No. 918, care of INDIA RUBBER WORLD.

MISCELLANEOUS

FOR SALE: APPROXIMATELY FIVE TONS OF HIGH-GRADE asbestos compressed sheet packing, graphited. New material in sheets 23" by 23" by $\frac{1}{16}$" thick. Palmer Equipment Co., 2741 N. Clybourn Ave., Chicago, Ill.

METAL-BOND CEMENT. ADAPTED FOR UNITING rubber or other materials to metal, wood, glass, or any surface with which it is usually difficult to secure a satisfactory bond. KENNETH R. ELWELL, La Grange, Ill.

RECLAIMED RUBBER

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption†	Consumption % to Crude	U. S. Stocks*	Exports
1935	122,140	113,530	22.9	25,069	5,383
1936	150,571	141,486	24.6	19,000	7,085
1937					
January	15,129	14,450	28.4	18,822	857
February	15,192	14,578	28.1	18,490	946
March	14,462	15,601	28.9	16,450	901
April	13,884	15,607	30.1	14,046	1,140
May	15,793	14,693	28.4	14,647	890
June	16,052	14,414	27.8	14,535	1,077
July	16,241	12,128	27.3	17,682	1,221
August	16,543	13,227	31.9	19,706	1,240
September	16,410	13,681	31.2	21,597	1,152
October	15,849	12,234	31.6	23,752	1,621
November	12,406	9,703	28.6	24,620	....

*Stocks on hand the last of the month or year. †Corrected to 100% from estimate of reported coverage.
Compiled by The Rubber Manufacturers Association, Inc.

CONSUMPTION of reclaimed rubber in the United States during November is estimated at 9,703 long tons; production 12,406 long tons; stocks on hand at the end of November, 24,620 long tons, according to the Rubber Manufacturers Association, Inc. Consumption of reclaim during October totaled 12,234 tons, constituting 31.6% of crude consumption. Following the general trends, demand for reclaim has fallen off, resulting in a somewhat curtailed production.

The market is easier as reflected in the price reductions below. No. 1 floating tube was off 4½¢ per pound; compounded and red tubes receded 1½¢ per pound; and white miscellaneous grade dropped 2¢ per pound. Other reclaim prices remain unchanged.

New York Quotations

December 22, 1937

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	6¼/ 6½
Acid	1.18-1.22	7¼/ 7½
Shoe		
Standard	1.56-1.60	7 / 7¼
Tube		
No. 1 Floating	1.00	14½/15
Compounded	1.10-1.12	9 / 9½
Red Tube	1.15-1.30	9 / 9½
Miscellaneous		
Mechanical Blends	1.25-1.50	4½/ 5
White	1.35-1.50	13 /13½

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

NEW PUBLICATIONS

(*Continued from page 92*)

"Flow Carbon." Binney & Smith Co., 41 E. 42nd St., New York, N. Y. 82 pages. This interesting and informative illustrated book describes the history, development, properties, application, and testing of Micronex Beads, dustless carbon black. After discussing the early difficulties attendant upon the evolution of this type of carbon black, the present method of processing is thoroughly discussed. As now practiced, Micronex Beads are prepared by the single-liquid system, which consists of adding to the carbon black an amount of water less than that needed to form a free meniscus, the black being dampened to such a point as will permit bead formation with a minimum of mechanical manipulation. Diagrams and instructions are included for the flow handling of Micronex Beads. Recommendations cover both large- and small-scale handling, and it is suggested that consumers take advantage of this flow property for purposes of economy and efficiency. Two chapters are devoted to carbon black testing. These tests, while supplementary to regular rubber testing, are useful aids to the evalution of rubber black. The book, which is of a limited edition, is modern in its format, attractively bound, and contains a complete index to the text.

"Heat." Johns-Manville, 22 E. 40th St., New York, N. Y. 48 pages. Designed to be helpful and informative to the engineer, this book on heat is written in the language of the layman and provides a large amount of information on this important subject. "Heat" deals with the history, methods of transfer, and the conservation of heat. In regard to the latter the modern insulating materials available for conserving heat and their specific uses are described. The book contains more than 70 pertinent charts and illustrations.

FINANCIAL

Unless otherwise stated, the results of operations of the following companies are after deductions for operating expenses, normal federal income taxes, depreciation, and other charges, but before provision for federal surtax on undistributed earnings. Most of the figures are subject to final adjustments.

Lima Cord Sole & Heel Co., Lima, O., including Caledonia Co. Nine months ended September 30: net profit, $100,962, equal to 90¢ each on 112,600 capital shares.

Norwalk Tire & Rubber Co., Norwalk, Conn. Year to September 30: net profit, allowing for $4,560 surtax, $63,711, equal after annual dividend requirements on 8,784 shares of $50-par, 7% preferred stock (on which undeclared cumulative dividends in arrears amounted to $3.50 a share), to 16¢ each on 202,230 no-par common shares. Net profit in the preceding year was $18,426, or $2.10 on 8,784 shares of 7% preferred.

Seiberling Rubber Co., Akron, O. Year ended October 31: operating profit, $573,256. Sharp declines in crude rubber and cotton fabric values at the end of the year, however, necessitated an inventory write-down, which, with depreciation and interest charges, caused the firm to show a net loss of $10,443 for the period, contrasted with a net profit of $103,385 the year before.

Dividends Declared

Company		Stock	Rate	Payable	Stock of Record
American Hard Rubber Co.		Com.	$2.00 increased	Dec. 22	Dec. 10
American Hard Rubber Co.	8%	Pfd.	$2.00 q.	Dec. 31	....
Anaconda Wire & Cable Co.		Com.	$1.25 extra	Dec. 18	Dec. 11
Collyer Insulated Wire Co.		Com.	$0.35	....	Dec. 17
De Vilbiss Co.		Com.	$0.50 irregular	Dec. 15	Nov. 30
Dewey & Almy Chemical Co.		Com.	$0.15 initial	Dec. 23	Dec. 20
Dewey & Almy Chemical Co. (new) cl B		Com.	$0.15 initial	Dec. 23	Dec. 20
Dominion Rubber Co., Ltd.	7%	Pfd.	$1.75 q.	Dec. 31	Dec. 23
Firestone Tire & Rubber Co.		Com.	$0.50 q.	Jan. 20	Jan. 5
Fisk Rubber Corp.		Pfd.	$1.50 q.	Dec. 20	Dec. 10
Fisk Rubber Corp.	6%	Pfd.	$1.50 q.	Dec. 20	Dec. 10
Flintkote Co.		Com.	$0.25	Dec. 20	Dec. 10
*Garlock Packing Co.		Com.	$2.00 special	Dec. 24	Dec. 11
Garlock Packing Co.		Com.	$0.75	Dec. 24	Dec. 11
General Cable Corp.	7%	Pfd.	$7.00 accum.	Dec. 17	Dec. 8
General Electric Co.		Com.	$1.00 q.	Dec. 20	Nov. 26
General Tire & Rubber Co.		Pfd.	$1.50 q.	Dec. 31	Dec. 20
Goodyear Tire & Rubber Co.		Com.	$0.50 extra	Dec. 23	Dec. 10
Goodyear Tire & Rubber Co. (Canada)		Pfd.	$0.62½ q.	Jan. 3	Dec. 15
Jenkins Bros.	7%	Pfd.	$1.75 q.	Dec. 24	Dec. 17
Jenkins Bros., Founders Shares		Com.	$1.00	Dec. 24	Dec. 18
Jenkins Bros., Non-voting		Com.	$0.25	Dec. 24	Dec. 17
I. B. Kleinert Rubber Co.		Com.	$0.05 extra	Dec. 24	Dec. 14
I. B. Kleinert Rubber Co.		Com.	$0.15 q.	Dec. 24	Dec. 14
Link Belt Co.		Com.	$1.00 extra	Dec. 23	Dec. 10
Link Belt Co.		Com.	$0.50 q.	Mar. 1	Feb. 15
O'Sullivan Rubber Co., Inc.		Com.	$0.05 q.	Dec. 24	Dec. 21
O'Sullivan Rubber Co., Inc.	6%	Pfd.	$0.37½ q.	Dec. 24	Dec. 21
Plymouth Rubber Co., B		Com.	$1.00 resumed	Dec. 28	Dec. 10
Western Electric Co.		Com.	$0.90	....	....

*Payable in 10-year 4½% notes.

Revenue Freight Loadings

Loadings of revenue freight in 1937 compared with 1936 and 1930 follow:

	1937	1936	1930
Five weeks in January	3,316,886	2,974,553	4,246,552
Four weeks in February	2,778,255	2,512,137	3,506,899
Four weeks in March	3,003,498	2,415,147	3,515,733
Four weeks in April	2,955,241	2,543,651	3,618,960
Five weeks in May	3,897,704	3,351,564	4,593,449
Four weeks in June	2,976,522	2,786,742	3,718,983
Five weeks in July	3,812,088	3,572,849	4,475,391
Four weeks in August	3,115,708	2,954,522	3,752,048
Four weeks in September	3,182,943	3,062,378	3,725,686
Five weeks in October	4,017,319	4,097,448	4,751,349
Week of November 6	732,145	759,615	881,517
Week of November 13	689,614	784,980	829,023
Week of November 20	647,251	789,772	779,752
Week of November 27	558,627	680,300	701,050
Total	35,683,801	33,285,658	43,096,392

Employment and Pay Rolls[1]

Release of November 22, Bureau of Labor Statistics, Department of Labor, covers index numbers for employment and pay rolls of leading United States industries. Those applying to the rubber manufacturing industry follow, with comparison to those for all industries:

	Oct., 1936	Sept., 1937	Oct., 1937	% Change Oct., '36-Oct., '37
All Industries:				
Employment	96.7	102.1	100.4	+ 3.8
Pay Rolls	89.0	100.1	100.2	+12.6
Rubber Products:				
Employment	97.9	98.0	97.5	— 0.4
Pay Rolls	96.8	97.4	93.9	— 3.0
Rubber Boots and Shoes:				
Employment	78.4	78.7	77.5	— 1.1
Pay Rolls	64.8	75.9	70.4	+ 8.6
Rubber Tires and Tubes:				
Employment	89.0	88.3	86.6	— 2.7
Pay Rolls	93.8	90.4	83.5	—11.0
Other Rubber Goods:				
Employment	132.9	134.7	137.4	+ 3.4
Pay Rolls	128.1	132.6	139.9	+ 9.2

(Three-year average 1923-1925 equals 100.)

[1]From "Rubber News Letter," Nov. 30, 1937, U. S. Bureau of Foreign & Domestic Commerce, Washington, D. C.

New York Quotations

(*Continued from page 86*)

Rubber Substitutes (*Cont'd*)

Factice		
Amberex	lb.	$0.19
Brown	lb.	.08 /$0.14
Neophax A	lb.	.125
B	lb.	.1275
Fac-Cel B	lb.	.17
C	lb.	.17
White	lb.	.095 / .155

Softeners

Burgundy pitch	lb.	.06
Cycline oil	gal.	.20
Nuba Resinous pitch (drums)		
Grades No. 1 and No. 2	lb.	.03
Grade No. 3	lb.	.04
Palm oil (Witco), c.l.	lb.	.0575
Pine tar	gal.	
Plastogen	lb.	
Plastone	lb.	.30 / .35
R-19 Resin (drums)	lb	.19
R-21 Resin (drums)	lb	.10
Reogen	lb.	
Rosin oil, compounded	gal.	.40
RPA No. 1	lb.	
No. 3	lb.	
Rubtack	lb.	.10
Tackol	lb.	.115
Tonox	lb.	.16
Powder	lb.	
Witco No. 20	gal.	.20
X-1 Resinous oil (tank car)	lb.	.01

Softeners for Hard Rubber Compounding

Resin C Pitch 55° C. M.P.	lb.	.013 / .014
Resin C Pitch 70° C. M.P.	lb.	.013 / .014
Resin C Pitch 85° C. M.P.	lb.	.013 / .014

Solvents

Beta-Trichlorethane	gal.	
Bondogen	lb.	
Carbon bisulphide	lb.	
tetrachloride	lb.	
Industrial 90% benzol (tank car)	gal.	.16

Stabilizers for Cure

Laurex, ton lots	lb.	
Stearex B	lb.	.105 / .115
Beads	lb.	.095 / .105
Stearic acid, single pressed	lb.	.105 / .115
Stearite	100 lbs.	9.50 /10.50
Zinc stearate	lb.	.23

Synthetic Rubber

Neoprene Latex Type 50	lb.	
53	lb.	
54	lb.	
Type E	lb.	
"Thiokol" A (f.o.b. Yardville)	lb.	$0.35
Coating Materials	gal.	2.50 /$5.00
DX	lb.	.55
Molding Powder	lb.	.50 / .75

Tackifier

B. R. H. No. 2	lb.	.015 / .016

Varnish

Shoe	gal.	1.45

Vulcanizing Ingredients

Sulphur		
Chloride, drums	lb.	.035 / .04
Rubber	100 lb.	2.65
Telloy	lb.	
Vandex	lb.	

(See also Colors—Antimony)

Waxes

Carnauba, No. 3 chalky	lb.	.37½
2 N.C.	lb.	.39½
3 N.C.	lb.	.37½
1 Yellow	lb.	.4575
2	lb.	.4425
Montan, crude	lb.	.11

"Rex-Tube Metal Oil Hose." Chicago Metal Hose Corp., Maywood, Ill. Four pages. This leaflet describes the application and construction of Rex-Tube, type RT15, and contains information on the various kinds of brass couplings available for flexible metal hose connections. Available in either galvanized steel or bronze with interlocking construction, RT15 hose is recommended for unloading and loaing oil tankers and barges as well as for unloading and steaming out tank-cars. This hose conforms to U. S. Navy specifications for marine application.

Ohio

(*Continued from page 70*)

to reasonably high rates of pay because it has to contend with inclement weather and slack times, but no more obstacles should be thrown in the way of people who want to build than the Lord throws in by sending unfavorable weather. . . .

"In the rubber industry, probably more tires will be sold through tire dealers next year than in the year just past, because the tire replacement demand is bound to be greater. . . .

"In the past three years, there was greatly-increased motor-car production and nearly all of those cars are now ready for new tires. . . .

"In 1937, more than 700,000 new trucks were sold, an increase of 50,000 trucks over the total number sold in 1936. It is practically certain that more trucks will be sold in 1938 than were sold in 1937.

"Trucks are bought to run and are the last type of transportation to be allowed to stand idle, so it is likely that more truck tires will be used in 1938 than ever before."

Comparing conditions now with those of recent years, Mr. O'Neil says, "In the depths of the other recent depression, our company's dollar sales fell off, but not our unit sales. Our dollar sales decreased then because the cost of raw materials dropped radically but that is not true today and we look for no falling off in dollar sales."

National Rubber Machinery Co., Akron, recently within ten days added 50 workers to its payroll to take care of increasing business.

Latex Processing, Inc., it is reported, will start a factory in Akron with an investment probably around $50,000. The firm, which will manufacture latex products, plans to have offices in Cleveland and factory buildings in the Rubber City, according to Attorney Spencer W. Pitts, who handled the Ohio incorporation of the firm. He is not at liberty to disclose further details.

New Tire Guarantee

In order to clarify the conditions under which adjustments are to be made on tires reported by the customer as giving unsatisfactory service, some tire manufacturers have recently adopted a guarantee policy. The certificate issued to the purchaser reads as follows:

"Every tire of our manufacture, bearing our name and serial number, is guaranteed by us to be free from defects in workmanship and material, without limit as to time or mileage, and to give satisfactory service under normal operating conditions. If our examination shows that any tire has failed under the terms of this guarantee, we will either repair the tire or make an allowance on the purchase of a new tire."

Rubber Goods Production Statistics

		1937 Sept.	1936 Sept.
Tires and Tubes*		....	....
MISCELLANEOUS PRODUCTS			
Single and double texture proofed fabrics			
Production	thous. of yds.	3,975	4,849
Rubber and canvas footwear			
Production, total	thous. of prs.	6,598	6,003
Tennis	thous. of prs.	1,557	1,150
Waterproof	thous. of prs.	5,040	4,853
Shipments, total	thous. of prs.	7,316	8,063
Tennis	thous. of prs.	1,134	1,481
Waterproof	thous. of prs.	6,182	6,582
Shipments, domestic, total	thous. of prs.	7,254	8,039
Tennis	thous. of prs.	1,093	1,465
Waterproof	thous. of prs.	6,161	6,574
Stocks, total, end of month	thous. of prs.	20,046	14,567
Tennis	thous. of prs.	5,431	3,286
Waterproof	thous. of prs.	14,615	11,281

*Monthly data no longer available.

The above figures have been adjusted to represent 100% of the industry based on reports received which represented 81% for 1936-37.

Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	INQUIRY
2408	Manufacturer of rubber coated paper.
2409	Manufacturer of tape with woven edges, impregnated with and coated with rubber on both sides and partly cured so that when pressed on to another rubber part and properly heated, it will vulcanize thereto.
2410	Supplier of rubber suitable for molding in plaster Paris molds.
2411	Manufacturer of extruded rubber forms.
2412	Information wanted on tire retreading where removing the old tread is unnecessary and the new tread comes in an endless cured or semi-cured strip of rubber and need only be vulcanized in place on the tire.
2413	Manufacturer of machine for printing erasers and filling in boxes.
2414	Manufacturer of grayish rubber stripping one inch wide with rounded edges and four ridges down the center.
2415	Manufacturer of vaginal pessaries.
2416	Manufacturer of machine for cutting raw hollow tubed stock.
2417	Information wanted on soap tree bark for lubricating steel molds.
2418	Manufacturer of white tack bumpers, ¼- or ½-inch size.
2419	Who retreads or recaps tires.
2420	Manufacturer of Collatone.
2421	Supplier of "Cardolite."
2422	Manufacturer of rubber doll heads.

World Net Imports of Crude Rubber

Year	U.S.A.	U.K.†	Australia	Belgium	Canada	Czecho-slovakia	France	Germany	Italy	Japan	Russia	Rest of the World	Total
1935	455,800	175,100	10,000	7,600	26,900	11,200	52,300	62,900	25,400	57,600	37,600	59,100	935,200
1936	475,361	62,676	14,423	9,627	27,867	8,772	56,777	71,793	15,998	61,701	30,967	64,647	831,148
1937													
Jan.	42,655	3,855	590	854	1,632	567	4,701	7,041	1,762	8,298	2,633	5,959	76,450
Feb.	44,398	6,081	331	1,363	1,271	837	5,276	7,911	1,477	6,605	3.048	5,068	77,363
Mar.	39,888	7,197	1,293	1,614	2,612	601	5,130	7,668	1,999	6,914	3,598	6,172	77,859
Apr.	42,066	9,871	1,058	1,069	1,343	1,445	5,302	8,664	1,589	5,808	1,532	5,843	79,527
May	48,506	8,488*	1,287	2,113	4,187	925	5,619	6,706	2,745	8,597	1,886	6,244	94,915
June	48,972	10,437	2,258	1,630	3,790	1,150	6,022	6,469	1,745	7,608	3,940	6,127	94,868
July	43,018	13,854	1,959	851	1,946	754	4,315	7,860	2,662	4,869	2,150	5,865	86,877
Aug.	49,485	18,483	2,114	1,013	3,506	1,692	4,499	8,752	2,447	4,411	1,226	5,355	100,455
Sept.	56,685	16,654	3,104	1,258	2,396	1,369	4,732	10,595	1,941	3,671	1,391	5,482	108,295

*Estimate. †U.K. figures show gross imports, not net imports. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Shipments of Crude Rubber from Producing Countries

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Siam	French Indo-China	Total	Philippines and Oceania	Africa	South America	Mexican Guayule	Grand Total
1935	417,000	282,900	54,300	9,100	4,900	8,900	19,300	28,300	28,700	853,400	1,500*	5,000	12,200	500	872,600
1936	353,667	309,630	49,685	8,648	5,859	8,177	21,013	34,578	40,769	832,026	1,619*	6,122	14,632	1,228	855,627
1937															
Jan.	24,746	27,132	4,514	487	579	1,234	4,015	3,849	2,823	69,379	80	635	1,286	160	71,540
Feb.	24,138	26,770	5,603	1,033	843	790	2,015	3,554	3,081	67,827	180	537	1,789	206	70,539
Mar.	40,138	40,929	7,049	885	1,149	1,239	1,425	3,873	3,160	99,847	181	472	1,792	136	102,428
Apr.	41,696	33,136	3,419	627	559	783	2,960	1,899	2,098	87,177	124	574	1,546	190	89,611
May	33,929	38,828	4,607	445	562	778	742	2,238	2,888	85,017	98	676	1,057	182	87,030
June	31,376	47,387	5,149	662	430	813	1,890	2,933	3,673	94,313	117	·621	915	145	96,111
July	45,900	44,240	6,279	703	263	1,414	2,543	3,175	5,563	110,080	111	872	940	371	112,374
Aug.	43,281	40,838	7,308	471	134	1,189	1,624	2,999	2,277	100,121	187	726	1,314	335	102,683
Sept.	48,515	38,449	5,804	944	148	969	2,659	3,173	4,131	104,792	140	600*	1,060	329	106,921
Oct.	47,586	33,834	6,702	1,000	254	1,505	523	2,352	3,751	97,507	200*	600*	1,204	200*	99,711

*Estimate. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

U. S. Crude and Waste Rubber Imports for 1937

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Totals 1937	Totals 1936	Balata	Miscellaneous	Waste
Jan. ....tons	30,674	1,171	625	167	23	160	..	32,820	31,292	13	383	201
Feb.	40,326	2,100	717	15	2	129	..	43,289	35,219	37	1,300	217
Mar.	48,367	2,117	1,285	47	11	212	..	52,039	37,451	21	894	572
April	33,147	1,683	734	79	17	190	..	35,850	40,370	6	283	99
May	48,196	1,809	612	46	2	175	..	50,840	35,598	44	669	868
June	45,680	2,678	318	70	22	188	..	48,956	41,835	47	641	374
July	36,315	2,154	140	75	11	413	..	39,108	35,881	44	726	307
Aug.	46,627	1,460	120	283	2	293	..	48,785	42,562	14	513	266
Sept.	53,942	1,395	229	146	8	329	..	56,049	48,386	55	738	72
Oct.	49,915	2,085	266	31	41	170	..	52,508	40,920	58	524	197
Nov.	53,729	1,744	272	174	39	344	..	56,302	44,296	39	639	128
Total 11 mos., 1937 ....tons	486,918	20,396	5,318	1,133	178	2,603	..	516,546	.....	378	7,310	3,301
Total 11 mos., 1936 ....tons	412,905	14,737	3,640	958	476	1,094	..	......	433,810	937	7,173	2,079

Compiled from The Rubber Manufacturers Association, Inc., statistics.

United States Latex Imports

Year	Pounds	Value
1934	29,276,134	$3,633,253
1935	30,358,748	3,782,222
1936	44,469,504	6,659,899
1937		
Jan.	2,995,027	535,546
Feb.	4,418,474	775,202
Mar.	4,962,915	968,053
Apr.	3,658,660	724,757
May	4,470,572	941,235
June	5,737,563	1,253,370
July	4,302,503	924,127
Aug.	4,033,306	838,778
Sept.	4,258,048	839,159
Oct.	4,384,892	844,205

Data from Leather and Rubber Division, United States Department of Commerce, Washington, D. C.

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	September, 1937		Nine Months Ended September, 1937	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	123,475,480	$22,119,248	903,460,359	$172,216,419
Liquid latex	4,258,048	839,159	38,837,068	7,800,227
Jelutong or pontianak	1,570,914	214,511	10,596,591	1,202,828
Balata	11,072	2,196	594,537	118,389
Gutta percha	43,725	16,885	1,313,116	273,274
Guayule	737,200	90,822	4,597,500	573,896
Siak	39,250	3,614	364,886	32,568
Scrap and reclaimed	751,505	18,739	10,996,814	339,013
Totals	130,887,194	$23,305,174	970,760,871	$182,556,614
Chicle, crude ... *Free*	28,500	$7,581	7,703,635	$2,196,463
MANUFACTURED—*Dutiable*				
Rubber tires ... *number*	1,028	$3,084	55,443	$99,721
Rubber boots, shoes, and overshoes ... *pairs*	1,637	625	24,672	11,755
Rubber soled footwear with fabric uppers ... *pairs*	58,256	12,258	692,718	180,539
Golf balls ... *number*	4,836	763	485,634	56,313
Lawn tennis balls ... *number*	1,776	317	304,074	26,541
Other rubber balls ... *number*	81,998	2,878	4,084,205	137,445
Other rubber toys, except balls	20,135	3,561	634,345	91,456
Hard rubber combs ... *number*	65,016	4,550	637,536	40,981
Other manufactures of hard rubber	......	1,944	......	26,709
Friction or insulating tape	15,450	866	121,980	6,869
Belts, hose, packing, and insulating material	......	11,695	......	200,205
Druggists' sundries of soft rubber	......	5,245	......	60,687
Inflatable swimming belts, floats, etc. ... *number*	6,912	274	871,703	57,850
Other rubber and gutta percha manufactures ... *lb.*	74,262	18,709	1,245,466	275,032
Totals	......	$66,769	......	$1,272,103

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber	1,496,131	$280,741	15,792,190	$3,055,677
Balata	34,923	9,481	544,541	156,988
Gutta percha, rubber substitutes, and scrap	107,031	15,244	628,232	124,266
Rubber manufactures	......	1,879	......	19,004
Totals	......	$307,345	......	$3,355,935

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed ... *lb.*	2,579,720	$133,710	21,001,334	$989,087
Scrap ... *lb.*	3,999,921	101,721	62,463,341	1,233,326
Cements ... *gal.*	25,942	21,857	253,781	223,550
Rubberized automobile cloth, *sq. yd.*	31,995	15,459	458,551	205,109
Other rubberized piece goods and hospital sheeting *sq. yd.*	138,455	59,723	1,416,505	604,556
Footwear				
Boots ... *pairs*	7,574	14,954	69,394	156,380
Shoes ... *pairs*	24,201	21,769	201,482	111,779
Canvas shoes with rubber soles ... *pairs*	19,832	12,576	353,982	210,282
Soles ... *doz. prs.*	6,626	12,106	35,711	69,146
Heels ... *doz. prs.*	21,984	15,893	440,385	261,407
Soling and top lift sheets	50,164	10,000	514,701	96,159
Gloves and mittens ... *doz. prs.*	11,029	20,119	67,201	143,100
Water bottles and fountain syringes ... *number*	33,840	15,081	245,517	98,023
Other druggists' sundries	......	40,516	......	440,119
Gum rubber clothing *doz.*	24,383	38,091	255,329	429,136
Balloons ... *gross*	29,369	29,744	329,543	251,041
Toys and balls	......	16,954	......	121,731
Bathing caps ... *doz.*	1,915	3,038	45,852	71,282
Bands ... *lb.*	15,693	7,359	215,409	88,495
Erasers ... *lb.*	35,078	19,604	311,137	176,322
Hard rubber goods				
Electrical battery boxes	22,521	14,385	227,812	134,721
Other electrical *lb.*	38,493	9,518	338,621	77,019
combs, finished *doz.*	15,073	6,152	95,310	57,712
Other hard rubber goods	......	13,137	......	186,042
Tires				
Truck and bus casings, *number*	23,657	535,656	165,060	3,318,492
Other automobile casings, *number*	55,806	582,169	609,223	6,378,937
Tubes, auto ... *number*	50,695	88,529	500,520	768,219
Other casings and tubes, *number*	6,009	39,826	60,595	439,476
Solid tires for automobiles and motor trucks *number*	278	12,059	3,204	97,089
Other solid tires	85,622	13,717	807,120	128,237
Tire sundries and repair materials	......	56,174	......	632,015
Rubber and friction tape ... *lb.*	103,364	21,424	648,293	167,674
Fan belts for automobiles *lb.*	48,934	31,690	582,591	327,510
Other rubber and balata belts ... *lb.*	273,383	134,379	2,454,854	1,282,480
Garden hose ... *lb.*	45,099	12,734	713,853	146,470
Other hose and tubing ... *lb.*	381,157	155,224	4,089,039	1,574,723
Packing	155,445	69,375	1,402,371	611,826
Mats, matting, flooring, and tiling	70,321	10,348	878,302	134,630
Thread	16,803	12,352	557,559	291,203
Gutta percha manufactures	23,066	8,773	919,872	261,945
Other rubber manufactures	......	110,168	......	995,096
Totals	......	$2,548,063	......	$23,991,546

Rubber Questionnaire

Third Quarter, 1937*

	Long Tons			
RECLAIMED RUBBER	Inventory at End of Quarter	Production	Shipments	Consumption
Reclaimers solely (6)	3,280	21,949	20,735	....
Manufacturers who also reclaim (17)	6,247	16,085	4,680	12,389
Other manufacturers (101)	8,758	.....	.....	14,109
Totals	18,285	38,304	25,415	26,498

	Long Tons		
SCRAP RUBBER	Inventory	Consumption	Due on Contracts
Reclaimers solely (6)	49,652	22,507	22,536
Manufacturers who also reclaim (15)	39,933	19,982	17,696
Other manufacturers (11)	123	.....	.....
Totals	89,708	42,489	40,232

Tons of Rubber Consumed in Rubber Products and Total Sales Value of Shipments

PRODUCTS	Rubber Consumed Long Tons	Total Sales Value of Shipments of Manufactured Rubber Products
Tires and Tire Sundries		
All types pneumatic casings (except bicycle, airplane)	61,277	$85,335,000
All types pneumatic tubes (except bicycle, airplane)	9,792	11,479,000
Bicycle tires, including juvenile pneumatics (single tubes, casings, and tubes)	602	1,464,000
Airplane tires and tubes	46	165,000
Solid and cushion tires for highway transportation	155	156,000
All other solid and cushion tires	117	447,000
Tire sundries and repair materials	2,038	3,098,000
Totals	74,027	$102,144,000
Other Rubber Products		
Mechanical rubber goods	10,851	$31,934,000
Boots and shoes	5,226	19,212,000
Insulated wire and cable compounds	1,651	†
Druggists' sundries, medical and surgical rubber goods	950	2,661,000
Stationers' rubber goods	461	662,000
Bathing apparel	194	281,000
Miscellaneous rubber sundries	731	1,335,000
Rubber clothing	170	1,162,000
Automobile fabrics	105	690,000
Other rubberized fabrics	890	2,791,000
Hard rubber goods	647	2,584,000
Heels and soles	1,905	3,597,000
Rubber flooring	311	583,000
Sponge rubber	931	1,241,000
Sporting goods, toys, and novelties	419	1,481,000
Totals	25,442	$70,214,000
Grand totals—all products	99,469	$172,358,000

Inventory of Rubber in the United States and Afloat

	Long Tons	
	Crude Rubber on Hand	Crude Rubber Afloat
Manufacturers	86,978	25,056
Importers and dealers	54,704	56,297
Totals	141,682	81,353

*Number of rubber manufacturers that reported data was 179; crude rubber importers and dealers, 45; reclaimers (solely), 6; total daily average number of employes (reporting manufacturers and reclaimers), 146,408.

It is estimated that the reported grand total crude rubber consumption is 77.1%; grand total sales value, 80%; the grand total crude rubber inventory, 77.6%; afloat figures; unavailable; the reclaimed rubber production, 77.3%; reclaimed consumption, 67.9%; and reclaimed inventory, 84.7% of the total of the entire industry.

†Owing to the difficulty of securing representative sales figures this item has been discontinued.

Compiled from statistics supplied by The Rubber Manufacturers Association, Inc.

Imports by Customs Districts

	October, 1937 *Crude Rubber		October, 1936 *Crude Rubber	
	Pounds	Value	Pounds	Value
Massachusetts	10,766,921	$2,012,533	8,963,300	$1,460,378
St. Lawrence	......	......	1,303	189
New York	80,085,000	13,769,436	65,425,758	10,181,864
Philadelphia	5,436,871	943,504	1,809,974	285,814
Maryland	8,918,291	1,582,351	2,387,441	375,777
Georgia	......	......	889,830	141,205
New Orleans	5,462,539	1,269,757	2,314,667	361,366
Los Angeles	7,616,655	1,362,589	9,412,587	1,237,109
San Francisco	1,026,163	174,134	525,626	79,287
Oregon	24,640	4,617	......	......
Ohio	56,921	13,893	286,026	36,782
Colorado	168,000	30,462	......	......
Totals	119,562,001	$21,163,276	92,016,512	$14,159,771

*Crude rubber including latex dry rubber content